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An Address.[1]

By C. W. ANDERSON,
Perth.

IN this Branch the retiring President has twelve months to sort out his thoughts on the subject matter for his address. In practice, it is difficult to emphasize and mention the important.

As a general practitioner, I find that my interests have been so varied that I must touch on a number of subjects. Firstly, our domestic affairs. The event which impressed me most was the opening of B.M.A. House in October, 1958. As you know, the function had significance in the traditions of my family, and it brought together generations of doctors who had not assembled before. Your representatives on the Federal Council hear favourable comment on the efforts of this Branch for the manner in which it has tackled the problems of accommodation and administration.

The Honorary Treasurer will tell you of the proposed reduction in the annual subscription. In retrospect, it should be realized that a decision was made to acquire a property in 1952-1953, and that in ten years (1962) it is possible that the property at 8 King's Park Road will be free of debt. The Honorary Treasurer will be informing you in more detail of the probable financial future. His task is made difficult by the proposal of the parent body to raise subscriptions in 1960.

It is possible that the consideration of intraprofessional relationships has been discussed and written about in too much detail. The late Wilfrid Kent Hughes told us as students that as we became older, more and more confidences would be given to us. In my particular practice, there are occasions when insurance company managers, lawyers and others want to discuss their files. The usual pattern is one in which there are varied opinions about an injured person's condition.

This problem is well known in America, as I discovered in a recent book. It can be stated quite definitely that the main sufferer is the patient. The third party attempts to adopt the specialist's report, which saves them money or gains more for the patient. The patient states that the

[1] Retiring President's address delivered to the annual general meeting of the Western Australian Branch of the British Medical Association on March 14, 1959.

specialist did not know what was wrong with him, and has neurotic elements grafted on to his condition and, from our medical point of view, friction occurs between doctors when discussion and tolerance would have produced a much more satisfactory situation for the patient. From my experience in Branch Council affairs, one can be definite and state that this situation occurs at all levels of the profession. Recent American writers have discussed disagreement among doctors. Difference of opinion is a healthy sign in medicine, but not a written disagreement disclosed to a third party. Cannot some of the blame for the existence of "quacks" be levelled at the profession? A human being can very easily come to the conclusion: "The doctors can't tell me what is wrong. I'll go and see this man they are talking about."

The deterioration of professional relationships could be related to the period when disability became compensable. It is very easy for a doctor who sees the patient at the late stages of illness or of an accident to feel that he could have handled the situation much better than his colleague, and the corollary is that the third party can be influenced in a similar way. Can too much emphasis be placed on the necessity for strict mental disciplines in dealing with a patient when the third party is involved? Perhaps this subject has wearied you, and is one in which an unwise statement can be distorted and used for adverse publicity. An improvement should be possible in this domestic field.

At a Federal level, the work of the Australasian Medical Publishing Company Limited deserves mention. This company is quite a big business, even by New South Wales standards. When the staff assembled to see the opening of the extensions there was a big crowd. The number and the quality of the publications for scientific and university bodies are impressive. There are several important policy decisions to be made this year. Whether or not the profession should publish a magazine of the English *Family Doctor* type is the the most important. If this is proceeded with, the capital cost could be £10,000 to begin publication. The Federal Council is to examine this question at its next meeting.

One of your past Presidents pointed out, when the *National Health Act* was inaugurated, that medico-political negotiations would become a part of medicine indefinitely. In the past four years the Federal Council has devoted most of its agenda to medico-political matters There are still various groups of doctors who feel that they have grievances under the *National Health Act*, and that their opinion is not adequately represented in the councils of the profession. This Branch made the suggestion that representation on the Federal Council should be widened to include representatives of the Royal Colleges. Apparently this suggestion caused much discussion at Branch Councils, and the motion, although defeated, will be brought forward again.

Two aspects of medicine in which the ancillary medical services are involved seem to deserve mention. One is the general question of rehabilitation of handicapped persons. At the risk of over-emphasis, I should like to repeat that the position in Australia is not satisfactory. With the slowing down of production, only a small number of these people can find employment. The Federal Council has shown a stimulating interest in this subject, but with the Federal elections of recent date, the projected approach to the Federal Government had to be postponed. Our request to any Government is likely to be, in general terms, for the establishment of a community service from which any genuinely handicapped person can obtain help in re-training and employment. It is interesting to note that the report dated November, 1958, of the Committee of Inquiry into Commonwealth Public Service Recruitment made recommendations that amendments should be made to the regulations to allow the employment of handicapped persons in suitable positions.

This Branch has been of assistance in the framing and proclamation of the *Occupational Therapists Act*. The Branch has assisted the Association of Occupational Therapists to become an incorporated body. The Act is similar in some ways to the *Physiotherapists Act*. Occupational therapy is considered by some doctors to be teaching persons to make baskets and do leatherwork. These crafts are used; but the skilled occupational therapist can be of great assistance when decisions have to be made as to continuing rehabilitation treatment of handicapped people. The approach to making a basket, the skill shown and, more importantly, any evidence of the person's being anxious to make a good basket, are valuable items of evidence in assessing whether to use the community's resources in further treatment.

I have already thanked the members of Council for the way they conducted the affairs of the Association. I would also thank those members who have represented the Branch on various committees and councils, and those who have given service on the various committees of the Branch Council.

ANTIBODY RESPONSE IN MAN TO TWO DOSES OF POLYVALENT INFLUENZA VIRUS VACCINE.

By M. F. WARBURTON, A. E. DUXBURY AND R. W. GREVILLE,
From the Commonwealth Serum Laboratories, Parkville, Victoria.

THE sudden appearance in 1957 of the antigenically novel strains of influenza type A, now referred to as A/Asian, caused a renewal of interest in the use and, therefore, the composition of influenza virus vaccine. The observations of Mulder and Masurel (1958), subsequently confirmed by Davenport and Hennessy (1958), that many sera from aged persons showed specific antibody to this A/Asian virus have been taken as evidence that this sub-type was responsible for the 1889-1890 pandemic of influenza. It seems reasonably certain that a virus of this variety was responsible for influenza prior to the First World War, and that it had world-wide distribution at that time. Moreover, its recurrence must lend weight to the theory that there are a limited number of antigenic varieties of the virus (Salk, 1952) and that a truly protective vaccine could be prepared provided that the full antigenic spectrum was available. On this basis all the sub-types which are known to have caused epidemic influenza should be included in our present vaccines, because past experience, especially in 1957, has demonstrated the impossibility of predicting with certainty the strains which will appear in any one year. With this in view, a polyvalent vaccine was prepared at the Commonwealth Serum Laboratories and made available during the year 1958.

As this was the first year in which a polyvalent influenza virus vaccine had been generally available in Australia, a series of three investigations was planned to ascertain the antibody response to and protection afforded by the vaccine. However, there was no evidence of true influenza virus infections in Australia during 1958, although many throat washings and sera from all over Australia were examined at the World Health Organization Influenza Centre at Commonwealth Serum Laboratories and at other laboratories. Consequently, one field trial designed to correlate antibody levels with protection failed for lack of challenge, and the work reported here is the result of two surveys of the serum antihæmagglutin antibody response following inoculations with polyvalent vaccine. Anti-hæmagglutinin titrations were chosen because previous work had shown that there was a broad correlation between the level of serum anti-hæmagglutinin and the frequency and severity of illness amongst subjects exposed to epidemics of the A/PR8 (Salk, Menke and Francis, 1945) and A/FMI (Meiklejohn, Kempe, Thalman and Lennette, 1952) sub-types of the virus, and we may assume that this is also true for other strains. Anti-hæmagglutinin titrations are economical, and may be carefully controlled provided an efficient method for the removal of non-specific inhibitor is employed.

Materials and Methods.

Composition of Vaccine.

The polyvalent vaccine issued by the Commonwealth Serum Laboratories during 1958, designed to meet both W.H.O. recommendations and the more specialized requirements of the National Institute of Health, Maryland, U.S.A., was proposed for all the surveys, and was used in the second survey reported below. Unfortunately, A/Swine and A/PR8 vaccines were not available for use when the first trial started. As A/Asian or recent B viruses were expected to be the types most likely to be encountered in any outbreak of influenza during 1958, it was desirable to have an early answer to the question of antibody response to these components in a polyvalent vaccine. Consequently, the first survey employed these components and only those others which were available, keeping the total virus content at 550 C.C.A. (chicken cell agglutinating) units, a level which overseas work suggests will not produce a large number of undesirable reactions after inoculation. Thus, both surveys employed vaccines with 200 C.C.A. units of an A/Asian strain isolated from throat washings received at the World Health Organization Influenza Centre, Commonwealth Serum Laboratories, late in 1957, from South Australia. In the first trial, 150 C.C.A. units of a type B virus were used; but in view of the excellent response, the level chosen for this virus in the polyvalent vaccine issued by Commonwealth Serum Laboratories was dropped to 100 C.C.A. units to allow the inclusion of larger amounts of other strains.

To maintain the total virus content at the 550 C.C.A. units level for the first trial, it was necessary to increase the concentrations of the A/W.A./56 (an A/Netherlands/56 type) and D/Sendai viruses in the vaccine used in that trial. The detailed constitutions of each 1 ml. dose of the two vaccines were as follows.

Vaccine A (C.C.A. Units)		Vaccine B. Commonwealth Serum Laboratories Polyvalent (C.C.A. Units)	
A/Asian	200	A/Asian	200
B/Tas.	150	B/Tas.	100
A/W.A.	100	A/W.A.	75
		A/PR8	75
		A/Swine	50
D/Sendai	100	D/Sendai	50
Total	550	Total	550

All viruses, excepting the type D, had been adapted for growth in each mouse lung, type A having an LD50 of, at least, 10^4 per 0·05 ml. of lung suspension, estimated by the method of Reed and Muench (1938).

Subjects.

Two populations were studied. Population A, which received vaccine A, consisted of 104 male and female employees at the Commonwealth Serum Laboratories whose ages ranged between 16 years and 65 years, the mean age being 36 years. Population B, which received vaccine B, consisted of 86 male and female employees at a large Commonwealth Government office in Melbourne, whose ages ranged between 16 years and 62 years, the mean age being 39 years.

All subjects were given two doses of 1 ml. of the vaccines described. In the first survey the interval between doses was three weeks, and in the second the interval was four weeks.

All volunteers in the first population were bled at the time of the first and second injections. They were then divided into two groups at random and bled on alternate weeks for the next four weeks. All available from both groups were bled 22 weeks after the second injection. The volunteers in the second population were bled at the time of the first and second injections and, again, two weeks after the second injection.

Sera.

Sera were treated to destroy non-specific inhibitor with the use of crude receptor destroying enzyme kindly made available by Mr. G. Ada of the Walter and Eliza Hall Institute. The use of crude receptor destroying enzyme or cholera filtrate to destroy non-specific inhibitor was found by prior experiments to be preferable to treatment with periodate, trypsin or the recently reported Russian method of saturation with carbon dioxide gas (Zhdanov, Zakatelskaya, Yefimova, Yachno and Khait, 1958).

Hæmagglutination Inhibition Tests.

The test used was the standard W.H.O. titration as carried out in plastic plates, with the use of 0·25 ml. of serial dilutions of the test sera and the addition of eight agglutination doses of virus contained in 0·25 ml. with 0·25 ml. of 0·5% fowl cells (W.H.O. Technical Report Series No. 64, 1953). Viruses used were the same strains as used in the preparation of the vaccine; all dilutions were made with the use of Takátsy loops (Takátsy, 1955). The titres quoted are reciprocals of the serum dilutions, and the lowest serum dilution used was 1:20. The titre of 20 was chosen because, from our interpretation of the work of Salk *et alii* (1945) and Meiklejohn *et alii* (1952), this is in excess of a protective level against influenza. As previously stated, this could not be verified by a true challenge test.

Results.

The distribution of titres and the geometric mean titres at the various bleeding times are shown by means of histograms in Figures I and II.

In the calculation of the geometric mean titres, all results less than 20 have been given an arbitrary value of 10 and this has been chosen as a reference level.

Antibody to A/Asian was detectable at the chosen level in sera from only two persons out of the combined total of 194 volunteers in both surveys, when they were bled immediately prior to vaccination. At the time of the second injection, three weeks later, the first group of volunteers showed a 70% conversion to detectable antibody, three individuals having titres as high as 640. During succeeding weeks the number with detectable antibody increased to 90%, and at three weeks after the second dose the geometric mean titre of the first group had reached 70·2. At five months there were still 60% of sera showing antibody, although the mean titre had dropped to 24·4.

In the second group, who received Commonwealth Serum Laboratories polyvalent vaccine containing, however, the same quantity of the A/Asian component, only 46% possessed demonstrable antibody before the second dose given four weeks after the first, and the significance of this difference between the two surveys will be discussed in another paper (Duxbury, Warburton and Greville, 1959).

This second group were bled on only one occasion after receiving the booster dose, and unfortunately this was carried out two weeks after that time. They showed a 70% conversion, but the mean titre had not reached a very high level. We believe now, from the results in the first group, that the peak response probably occurred after the time when the last blood sample was taken.

Two viruses which gave comparable results in both surveys were A/W.A./56 and B/Tas/53. Since they are representative of the viruses which caused serious outbreaks of influenza in Australia during the past decade, there must be a large proportion of our population which has experienced them. Our results indicate that in both trials somewhat over 20% of the volunteers were already showing titres of 20 or better against these strains prior to vaccination. The first dose resulted in approximately 70% and the second does in 90% to 100% of sera reaching that level.

The over-all response to vaccination with type D/Sendai was not as good as with the other viruses. The mean post-vaccination titres at all times were also significantly lower than those of other viruses. To our knowledge, there has not yet been an isolation of a type D virus in

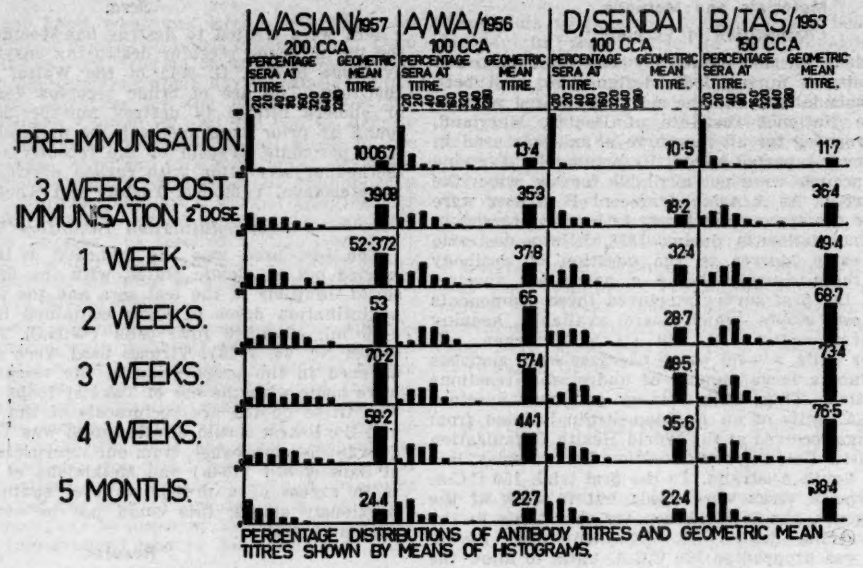

FIGURE I.

Percentage distributions of antibody titres and geometric mean titres shown by means of histograms in group who received vaccine A.

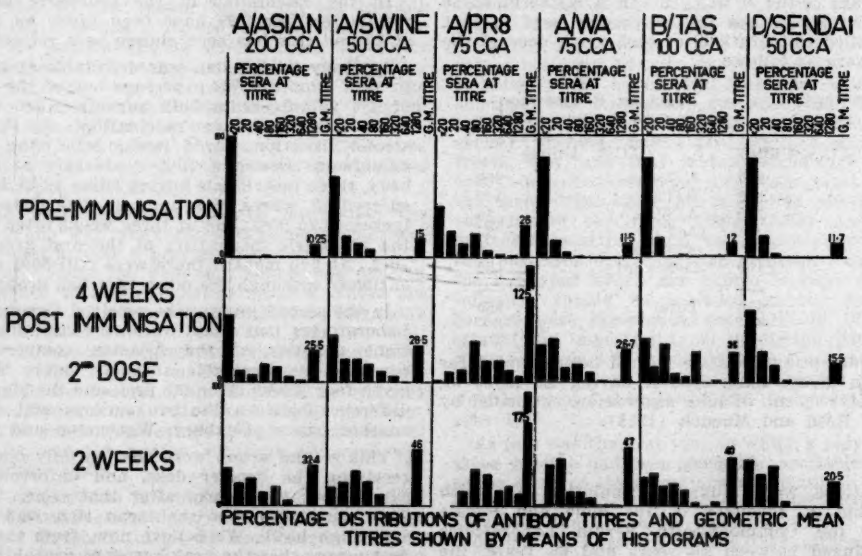

FIGURE II.

Percentage distributions of antibody titres and geometric mean titres shown by means of histograms in group who received vaccine B.

this country, although the detection of a low titre anti-hæmagglutinin antibody in some of the sera from preliminary bleedings in each of our surveys is in keeping with our earlier experience in routine examinations of samples of sera from the blood bank and also the observations of French (1955). A possible explanation for this may lie in the antigenic similarity of Sendai virus to other organisms. It has been shown that infection with mumps virus and croup viruses may stimulate the production of antibody against Sendai virus (De Meio and Walker, 1957; Chanock *et alii*, 1958), and there is now evidence that some cases of infectious mononucleosis behave similarly (De Meio and Walker, 1958).

The older strains A/Swine and A/PR8 (Figure II) showed the greatest proportion of high titres prior to immunization. This was to be expected because the two groups of volunteers, being adult, must have undergone exposure to one or both of these sub-types many times in the past. Strains of influenza virus akin to A/PR8 were isolated in 1934 and subsequent years until the advent of the so-called A Prime group in 1945, and are believed to have succeeded the A/Swine sub-type soon after the world pandemic at the close of the first Great War. The effect of even one dose of the vaccine was to produce demonstrable antibody to A/PR8 in 99% of the volunteers and to increase markedly the titres of those with pre-existing

antibody. A similar, but not so marked, effect was observed with the A/Swine strain which, it is believed, ceased to be a cause of epidemic influenza in the early 1920's.

The ages of the volunteers was the main factor in the different responses to these two components. This is shown in Figure III, where the responses in subjects aged 40 years and over are compared with those in subjects under 40. Selection of age 40 was based on the assumption that A/Swine did make its first appearance in 1918 and that all of the older group could have been exposed to it. Those under 40 grew up in the subsequent era when viruses similar to A/PR8 are known to have been prevalent.

Exposure to any type A influenza virus, by infection or vaccination, is believed to stimulate the production of antibody against the major antigens of the first type A

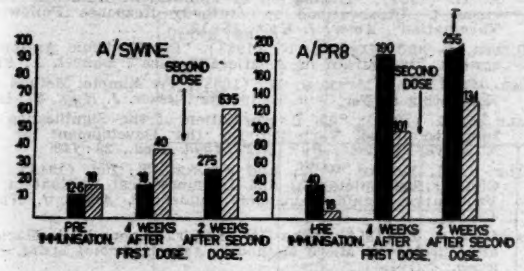

FIGURE III.

Geometric mean titres against A/Swine and A/PR8 in subjects under 40 years of age and in those aged 40 years and over prior to and after receiving vaccine B. Solid columns, under 40; hatched columns, 40 or over.

strain experienced in childhood. The relative responses by the two age groups tend to support this theory, but it should be noted that the actual mean titres of the older group were better against A/PR8 than against A/Swine. This can be explained if we assume that the group had recurrent experiences with A/PR8 type strains during outbreaks of influenza subsequent to the A/Swine era. The primary experience of the under 40 group with A/PR8 antigens would be followed by further exposures to this sub-type, and would account for the very high response to those antigens in our trial.

Persistence of Antibody.

Figure IV shows the persistence of antibody after vaccination. The percentages with titres of 20 or more in the first group of volunteers are plotted against times of sampling. All four viruses are neutralized to the chosen level by a high proportion of sera five months after the second dose. It is noteworthy that the most persistent antibody is against the B/Tas virus. This virus is related antigenically to strains that are known to have recurred in Australia since 1943, and many of the subjects of this survey must have been previously vaccinated against or experienced infection with this or similar strains.

Discussion.

In these surveys there was a marked increase in the mean antibody levels against each component strain after a second injection of polyvalent influenza vaccine. Except in the case of A/PR8, the second injection gave rise to an increase in the percentage of volunteers with presumably protective antibody levels to each strain. There was antibody to the A/PR8 strain at this level in 99% of sera four weeks after the first dose had been given.

Earlier work with human subjects on the comparative value of multiple-dose as against single-dose schedules of inoculations with influenza virus vaccine showed no significant increases in antibody with multiple as opposed to single injections. However, as Beveridge (1944) pointed out, at that time nearly all adults had, at least, a trace of antibody to the prevailing strains of influenza virus. Until 1945 the type A strains isolated were antigenically similar to A/PR8, and the preliminary bleeding in our surveys, as well as the results of our routine examination of sera from the blood bank, indicates that approximately 60% of adults in the southern States of Australia still have titres of 20 or more against this sub-type, although it made its last appearance as a cause of influenza more than a decade ago. The presence of this antibody in sera from groups of adults, in both 1944 and 1958, would be in keeping with the known exposure of these groups to A/PR8 type strains during influenza outbreaks in the 1920's and 1930's. As single injections of vaccine have produced such an excellent response in 1958, it is easy to believe that they would have produced maximal levels of antibody in the days when the A/PR8 sub-type had recently been prevalent in the community.

The report of the Medical Research Council Committee in Great Britain (1958) and the work of McCarron and Kilbourne (1958) showed the superiority of a two-dose over a single-dose schedule for producing good antibody responses in a large percentage of volunteers with no previous experience of A/Asian strain viruses. That two doses of vaccine could be used with profit in a primary course of immunization or whenever a novel strain occurs is also indicated by American reports which were published in the years following the time when A/FMI sub-type (A Prime) viruses superseded the A/PR8 sub-type as causes of influenza. Loosli, Schoenberger and Barnett (1948) found that there was a disappointing response to

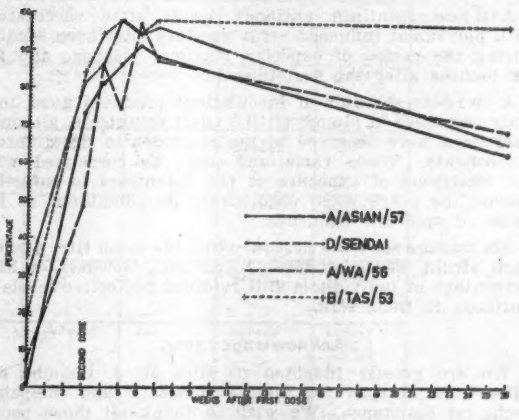

FIGURE IV.

Persistence of antibody; percentage of subjects with titres of 20 or greater.

a single dose of vaccine containing the A/FMI strain in 1947. In 1949 and 1950, Meiklejohn, Weiss, Shragg and Lennette (1952) obtained more promising results with a single dose of monovalent A/FMI vaccine, and Davenport *et alii* (1955) reported that in November, 1952, the response to the A/FMI component of a single dose of polyvalent vaccine was excellent. We believe that this improving response to single doses resulted from increasing experiences of the subjects with this strain or antigenically related viruses in the epidemics which occurred in 1947, 1949 and 1950 in the U.S.A.

French and Pietsch (1959) have investigated convalescent levels of antibody to A/Asian in subjects who contracted influenza in an epidemic caused by that virus on Ocean Island in 1957. Some of their subjects had received a single dose of vaccine containing 100 C.C.A. units of A/Asian, but admissions to hospital started to occur only five days after the last inoculations were given. Although there was insufficient time for the development of a protective level of antibody before exposure to infection (no protection was demonstrated), the convalescent levels of antibody in the vaccinated group were significantly

higher than in the unvaccinated. The geometric mean titres were respectively 34·0 and 6·6 with the use of a method which gives hæmagglutination-inhibition titres approximately half those of the W.H.O. test. These results indicate that a single infection with a new strain of influenza virus does not necessarily produce a good level of antibody. Reinfection or vaccination at a later date would be necessary to obtain high levels of antibody and, therefore, persisting protection.

After a reasonably good initial antigenic experience, such as results from an infection, or a course of two doses of a potent vaccine, a single booster dose of vaccine given in succeeding years may then be all that is necessary to protect against influenza viruses. Although all recent evidence indicates that multiple dose schedules are required to achieve effective primary immunization, there seems to be every likelihood that a single dose of vaccine in succeeding years will stimulate production of a protective antibody level in almost 100% of recipients. Whilst further work will be required to confirm this claim beyond all doubt, we are confident that careful selection of strains will ultimately provide a vaccine capable of maintaining protective antibody levels against all types and sub-types with a minimum number of booster doses. One single annual booster injection of the existing polyvalent vaccine should confer a high degree of protection against strains which have been identified with epidemic influenza up to the present time.

Summary.

Anti-hæmagglutinin antibody levels after vaccination with polyvalent influenza virus vaccines have been studied during the period of expected maximal response and for six months after the first injection.

A two-dose schedule of inoculations produced good antibody responses in almost all the adult volunteers, although variations were observed in the responses to the different components. These variations could be correlated with the likelihood of exposure of the volunteers to infection during the years when each strain was dominant as the cause of epidemic influenza.

Six months after the first injection the mean titre against each strain was considerably reduced. However, a high percentage of individuals still retained protective levels of antibody in their sera.

Acknowledgements.

We are greatly indebted to Miss M. J. Coombe and Miss I. M. Murphy for their enthusiastic and competent technical assistance. We wish to thank all those people at the Commonwealth Serum Laboratories and the Taxation Department, Melbourne, who generously cooperated in these trials.

We also wish to express our thanks to the Director, Commonwealth Serum Laboratories, for his interest in this work.

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ANTIBODY RESPONSE TO A/ASIAN COMPONENT OF POLYVALENT INFLUENZA VIRUS VACCINE.

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AND

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FIELD TRIALS conducted in the past to assess the value of influenza virus vaccines have shown repeatedly that when the strains causing an epidemic are antigenically similar to a strain included in the vaccine, then a considerable degree of protection is afforded to vaccinated persons.

The Medical Research Council Committee (1958) and the Commission on Influenza (1957) have shown that a protective effect averaging 60% has been obtained by vaccinating people with A/Asian virus vaccine prior to the onset of the epidemic in the locality.

However, despite the prompt isolation and distribution of the Asian virus by W.H.O. Laboratories, it was not possible, even in highly industrialized countries, to produce enough vaccine to protect more than a very small proportion of the population. Widelock, Klein, Peizer and Simonovic (1958) found that 70% of the population of New York were infected by the A/Asian virus during the epidemic there, and Keogh, Ferris, Lewis and Stevenson (1958) found that between 40% and 50% of the population of Melbourne were infected during the 1957 epidemic. Fortunately most cases of Asian influenza were mild. If the virus had had the pathogenic properties of the 1918 strain, the result might well have been catastrophic.

Some authorities (Francis, 1952; Salk, 1952) consider that the type A influenza viruses are not capable of infinite variation, but that there are a limited number of antigenic patterns.

It has been suggested by Davenport and Hennessy (1957) that a polyvalent vaccine containing representative viruses of all the major influenza strains would give a broad antigenic cover, which might anticipate the next new strain.

A polyvalent vaccine containing all the major known antigenic patterns of type A, the most recent pattern of type B and a type D influenza virus was made by Commonwealth Serum Laboratories; and an experiment was designed to measure the antibody response to the A/Asian component and other components in a group of people who had not been vaccinated previously against influenza. This group has been designated population B. As PR8 and Swine viruses were not immediately available for the preparation of this vaccine, a preliminary experiment was carried out with a modified polyvalent vaccine on a group of employees at Commonwealth Serum Laboratories, some of whom had been vaccinated previously against influenza. This group has been designated population A.

Analysis of the antibody responses to the A/Asian component in both groups showed some interesting features, which are reported here.

Materials and Methods.

Materials and methods have been fully described by us in another paper (Warburton, Duxbury and Greville, 1959). The two groups of people who were chosen worked at separate locations in Melbourne, three miles apart. They were of comparable age distribution. All were, we consider, equally exposed to A/Asian influenza during the epidemic in 1957.

Each subject received two doses of polyvalent influenza virus vaccine containing a total of 550 C.C.A. (chicken cell agglutinating) units of influenza viruses, including 200 C.C.A. units of the A/Asian strain.

As has been stated, populations A and B differed in that a large proportion of population A (62%) had been vaccinated during 1957 with a single dose of A/Asian vaccine. Some (34%) received 100 C.C.A. units, while others (28%) received only 37 C.C.A. units.

Sera were collected in the case of population A at the time of the first injection, three weeks later at the time of the second injection, and at the end of the fourth, fifth, sixth, seventh and twenty-fifth weeks after the first inoculation. In the case of population B, sera were collected at the time of the first injection, four weeks later when the second dose was given, and two weeks subsequently.

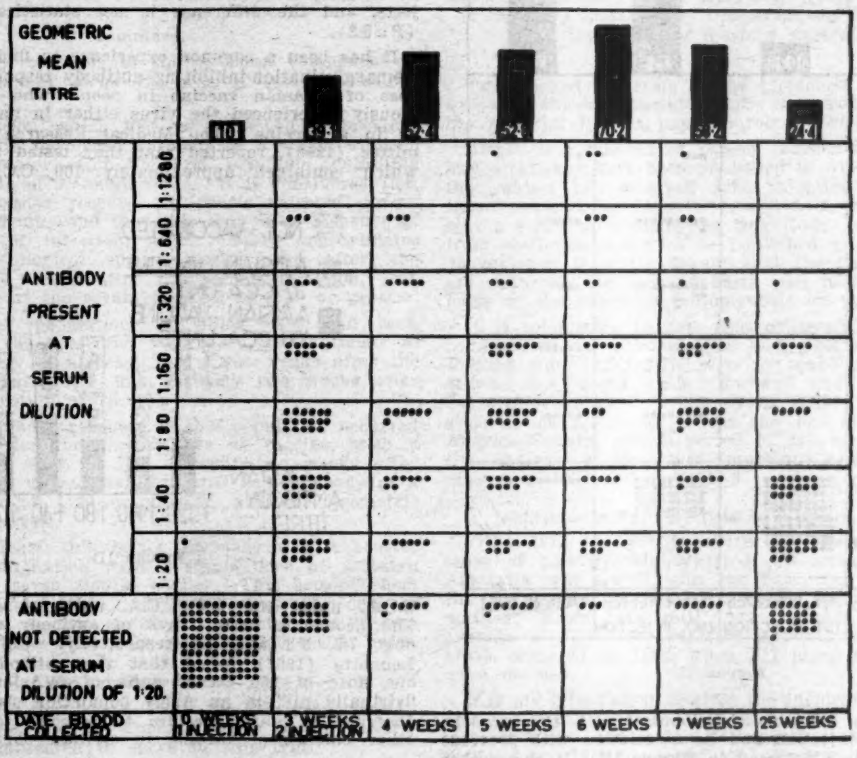

FIGURE I.

All sera were treated with crude receptor-destroying enzyme to remove non-specific inhibitors. The lowest dilution of serum tested for ability to inhibit eight haemagglutinating units of A/Asian virus was 1:20.

Results.

Figures I and II show the level of antibody to A/Asian influenza virus in the members of the two populations at the time the vaccine was injected and at the various time intervals afterwards.

At the time of the first injection only two people out of the total of 190 in both populations had detectable antibody to the A/Asian virus at the serum dilution of 1:20.

Population A.

Figure I shows the antibody response in population A. Sixty-six out of 90 (73%) subjects had antibody at a serum dilution of 1:20 or greater three weeks after the

first dose of vaccine. The geometric mean titre was 39·1. Two weeks after the second dose, 42 out of 49 (85%) had antibody at this dilution, with a geometrical mean titre of 52·8. The peak antibody response occurred three weeks after the second injection, when 29 out of 32 (90%) had antibodies at the serum dilution of 1:20 or greater, and the geometric mean titre was 70·2. Four weeks after the second dose of vaccine 42 out of 48 (87%) had antibody, and the geometric mean titre was 58·2. Twenty-two weeks after the second injection, the number with antibody at the dilution of 1:20 or greater had declined to 41 out of 66 (62%), and the geometric mean titre was 24·4.

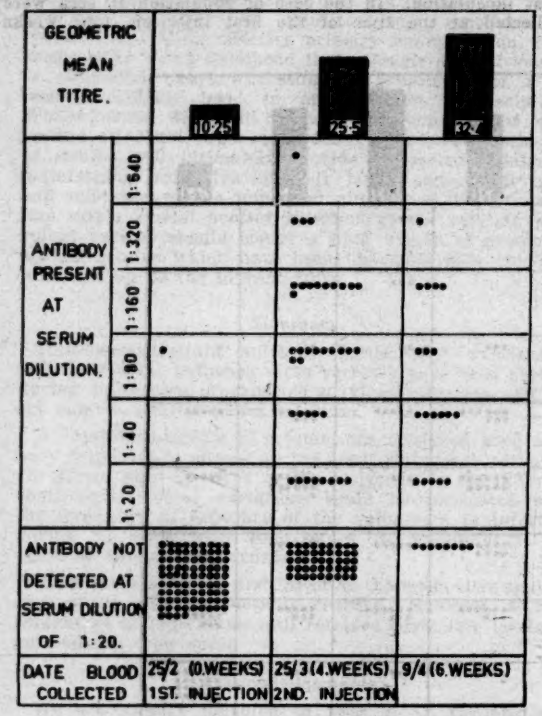

FIGURE II.

The antibody response in population A three weeks after the first injection and its association with previous immunization is illustrated in Figure III. It shows that 28 out of 31 (90%) subjects who received 100 C.C.A. units of A/Asian vaccine in 1957 responded with antibody at the serum dilution of at least 1:20 when given another dose of vaccine six months later. The other group vaccinated in 1957 had received only 37 C.C.A. units seven months before the present series. Eighteen out of 25 (72%) subjects showed antibody at the level of 1:20 or greater. Of those members of this population who received no vaccine in 1957, 19 out of 34 (56%) responded with antibody at the serum dilution of 1:20 or greater.

Population B.

Figure II shows that four weeks after the first injection in population B, 38 of the 83 persons tested (46%) had antibodies at the serum dilution of 1:20 or greater, and the geometric mean titre was 25·5. Two weeks after the second injection 19 out of 27 tested (70%) had antibodies at the titre of 1:20 or greater, with a geometric mean titre of 32·4.

Discussion.

It is interesting to note that only six months after the A/Asian influenza epidemic in Melbourne, in which, according to the studies of Keogh *et alii* (1958), between 40% and 50% of the population were infected, only 1% had detectable antibody to the A/Asian virus at the serum dilution of 1:20.

However, 46% of population B responded at the relatively high antibody level of at least 1:20 to the first dose of vaccine, and it is considered that this was a booster response in people whose antibody mechanism had been preconditioned to the A/Asian virus during the epidemic. Again, the proportion of those not previously immunized in population A, who developed antibodies at the serum dilution of 1:20 or greater, was 56%, and was believed to be a similar response. This does not necessarily indicate a higher rate of previous natural infection in this group compared with population B or the population studied by Keogh *et alii* (1958), as it comprised a considerably smaller number of subjects, and the difference is not statistically significant ($P = 0·3$).

It has been a common experience to find only a slight hæmagglutination-inhibiting antibody response to a single dose of A/Asian vaccine in people who have not previously experienced the virus either in natural infection or in a vaccine. The Medical Research Council Committee (1958), reported that they tested three vaccines, which contained approximately 100 C.C.A. units, 200

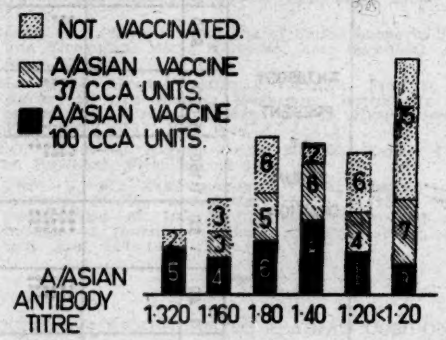

FIGURE III.

C.C.A. units and 400 C.C.A. units of A/Asian virus. The geometric mean titres of antibody responses were only 7·2, 9·8 and 7·6 respectively. Culver, Nitz and Lennette (1957) found that the antibody response to one dose of 250 C.C.A. units of A/Asian vaccine was "virtually nil" in an Army population studied, and had observed a similar failure to respond to one dose of other batches of vaccine in civilian population groups.

The achievement of an antibody titre of 1:20 or greater in a proportion (46% and 56%) of the previously unvaccinated groups after a single dose of vaccine is presumed to be due to a prior natural infection with A/Asian virus, and furthermore, this may be a measure of the incidence of infection in Melbourne during the 1957 epidemic. This is interesting, in view of the finding of Keogh *et alii* (1958) that 47·5% of 122 blood donors developed antibody during the epidemic. A comparable figure of the incidence has thus been reached by two quite different approaches.

Blood donors and the populations we studied are drawn from similar age groups. Keogh *et alii* tested for neutralizing antibodies in monkey kidney tissue culture, whereas we tested for hæmagglutination-inhibiting antibodies with egg cultured virus.

The high antibody response (90%) in the group previously immunized with 100 C.C.A. of A/Asian vaccine is significant compared with the response in those considered previously infected naturally in population A ($P = 0·002$) and in population B ($P < 0·001$).

Of those previously vaccinated with 37 C.C.A. units of A/Asian vaccine, 72% showed antibody response, and although this proportion is higher than in those not

previously vaccinated in population A (56%), it is not significantly different ($P = 0{\cdot}2$). If, however, the response is compared with that in population B (46%), then the difference is significant. The level in population B is probably more accurate as it is based on more subjects. The antibody response in those who received 37 C.C.A. units is therefore between the levels in those who received 100 C.C.A. units and those who did not receive any A/Asian vaccine previously.

We believe that these results indicate that many people had a good booster response to a dose of A/Asian vaccine given six months after a single dose of 100 C.C.A. units of A/Asian vaccine, and that some people showed a good booster response six months after a single dose of 37 C.C.A. units of A/Asian vaccine. A third group showed a good booster response after presumed natural infection.

Summary.

The antibody response to the A/Asian component of polyvalent influenza virus vaccines in two populations is described.

In a population which had not experienced previous vaccination, 46% developed antibody at a serum dilution of 1:20 or greater after the first injection containing 200 C.C.A. units of A/Asian virus. It is considered that this was a booster response in people infected during the recent epidemic, and that this may be a measure of the incidence of infection, which closely approximates that of a serological survey during and after the epidemic. Two weeks after the second injection, 70% had antibodies at the serum dilution of 1:20 or greater.

In the other population, in which 62% had been vaccinated in the preceding year, 73% had antibody at a serum dilution of at least 1:20 three weeks after the first injection, and 84% had antibody two weeks after the second injection of vaccine.

The peak antibody response in this population occurred three weeks after the second dose of vaccine, with a geometric mean titre of 70·2. Twenty-two weeks after the second dose of vaccine, 70% still had antibody at a serum dilution of 1:20 or greater, and the geometric mean titre was 24·4.

We suggest that this better response was a booster response to vaccination with a single dose of A/Asian vaccine, six to seven months earlier. This booster effect was observed even though, in some cases, the dose of virus had been as low as 37 C.C.A. units, but it was more marked when the virus dose was 100 C.C.A. units.

Acknowledgements.

We thank all the people from the Taxation Department, Melbourne, and the Commonwealth Serum Laboratories who volunteered to serve in this trial.

We are also indebted to Miss M. J. Coombe and Miss I. M. Murphy, who performed the antibody titrations, to Dr. J. J. Graydon, who carried out the statistical analysis, and to Dr. P. L. Bazeley, for his advice and interest in this study.

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POLIOMYELITIS IN PREGNANCY IN WESTERN AUSTRALIA.

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THE marked reduction in the incidence of poliomyelitis following the introduction of the Salk vaccine may make the material in this paper purely of historical interest.

Although a number of papers concerning poliomyelitis and pregnancy have been published in American journals, the subject has received scant mention in Australian literature, and the 31 cases analysed in this paper represent a series of comparative magnitude. As the findings from statistical analyses in published papers have been at variance, it would appear that the more cases there are reported, the more definite will become our knowledge of the effects of poliomyelitis on pregnant women.

It is interesting to note that as recently as 1947, the combination of poliomyelitis and pregnancy in Great Britain was sufficiently rare to make the publication of one case worth while (Maxwell and Willcox, 1947). On the other hand, Paula Horn (1955) has presented a series of 325 cases, which she has observed in Los Angeles County, over a period of 20 years. A comparative analysis of the more important series of reported cases is to be found in Table I.

Incidence of Poliomyelitis in Western Australia.

From 1913 to 1947 inclusive the average number of cases of poliomyelitis reported *per annum* in Western Australia was seven, with the exception of 1938, when the first severe outbreak occurred, and 47 cases were notified. From 1944 until 1947 inclusive, there was an average of 3·25 cases reported annually. A severe outbreak occurred in 1948, when 311 cases of poliomyelitis were notified.

It is my intention to analyse the incidence of pregnancy and poliomyelitis from 1948 until 1957 inclusive. The vital statistics concerning poliomyelitis in Western Australia from 1948 onwards are illustrated in Table II. A total of 1475 cases were notified. There were 65 deaths, a mortality of 4·4%. There were 375 cases in women in the age group 15 to 44 years. There were 14 deaths in this group, a mortality of 3·73%. Thirty-one patients were pregnant when they developed poliomyelitis. Eight of these died, a mortality of 25·8%, which is significantly higher than the rate for non-pregnant women at ages 15 to 44 years ($\chi^2 = 39{\cdot}362$ on one degree of freedom, where $P < 0{\cdot}001$). The total fœtal wastage was 12. There were three mothers who died undelivered, six abortions, two stillbirths and one neonatal death.

During the 1948 epidemic, there were nine pregnant women amongst 63 in the 15 to 44 years age group who contracted poliomyelitis. The number of women in that age group at risk, in 1948, was calculated to be 110,276. In the same year, there were 13,245 births and stillbirths, representing an average of 36·3 births per day. This figure, when multiplied by 280 (i.e., 10,161), roughly represents the number of pregnant women at risk, at any one time during the year.

These figures are best expressed in the accompanying table (Table III). The differences between the attack rates in pregnant and non-pregnant women are not statistically significant ($\chi^2 = 1{\cdot}938$).

TABLE I.
Comparative Analysis of Published Series.

Author.	Over-all Number of Cases of Poliomyelitis.	Number of Cases of Poliomyelitis and Pregnancy.	Percentage Incidence of Poliomyelitis and Pregnancy.	Maternal Mortality.	Foetal Wastage.	Incidence of Pregnancy in 17 to 45 Years Age Group.	Time of Onset of Poliomyelitis.
McCord *et alii* (1955).	1158 (patients admitted to hospital); 2284 reported cases.	51		6; mortality in other females of same age group was similar—19 out of 148.	Total: 14 (abortion, 7; neonatal deaths, 4; stillbirth, 1; died undelivered, 2).	Total (14 to 45 years), 199. Incidence of pregnancy, 25%. The pregnant females were all married—1 in 3 of married women with poliomyelitis. Calculated expected incidence of pregnancy in population, 10%.	Incidence similar in all trimesters—14, 20, 17. None in first month.
Paula Horn (1955).	16268.	325		5·2%.	Abortions, 43 (13%).		120 cases in first trimester (7 deaths); 126 in second trimester (4 deaths); 79 in third trimester (6 deaths).
Bowers and Danforth (1953).	657 cases (also reviewed literature of 586 cases occurring in 4169 cases of poliomyelitis).	24	3·7% of all cases of poliomyelitis.	6·28% of their own cases; 9·7% of series (higher than the death rate for non-pregnant women).	33% (5 abortions; 2 stillborn; 1 neonatal death).	17·1% of 15 to 47 years age group.	No significant difference—first trimester, 33%; second trimester, 36%; third trimester, 27·7%; post-partum, 3·5%; 60% of cases occurred in the age group 20 to 29 years; half deaths in third trimester and immediate puerperium; 75% of cases of poliomyelitis occurred in first and second pregnancies.
Priddle *et alii* (1952).	1131 (186 females in 17 to 45 years age group).	34		2·9% (non-pregnant mortality, 5·3%).	2 abortions, 1 stillborn, 1 neonatal death (post-mortem Cæsarean section).	19·2% (incidence of pregnancy in healthy females of 17 to 45 years age group, 6·2%).	Most common in second and third months. Severe poliomyelitis can occur at any period of gestation. Preponderance of male fœtuses—11:8.
Gifford and Hullinghorst (1948).	Not stated.	170 (review only)		19%.	26%.		
Weinstein and Meade (1955).	Not stated.	60		Not stated.		20% to 25% (in healthy females, 7%).	50% in second trimester.
Hunter and Millikan (1954).	1148 (190 females of reproductive age).	49		6%.	32% (8 abortions, 7 stillborn and neonatal deaths).	26%.	No significant difference in trimester.
Siegel and Greeberg (1955).	643 cases in females of 15 to 49 years age group.	87	Incidence of pregnancy in poliomyelitis cases, 58·8% higher than the expected rate.	Less than the total mortality for women of child-bearing age.			Most common in third (1/4), fourth (1/6) and fifth (1/6) months. More common in *multiparæ* than in *primigravidæ*.
Western Australian Series (1948–1957).	1475.	31	2·1%.	25·8%.	38·7% (3 died undelivered, 6 abortions, 2 stillborn, 1 neonatal death).	8%.	First trimester, 11 cases; second trimester, 8 cases; third trimester, 12 cases. 64·5% occurred in patients aged 20 to 25 years inclusive.

Allowing for abortions, by introducing an arbitrary abortion rate of 20% (De Lee and Greenhill, 1947) the attack rates for poliomyelitis in pregnant and non-pregnant women would be even closer, and the difference would not be significant. Bowers and Danforth (1953) also considered that pregnant women were no more susceptible to poliomyelitis than non-pregnant. On the other hand, Priddle *et alii* (1952), Weinstein and Meade (1955), McCord *et alii* (1955) and Horn (1955) found that the susceptibility of pregnant women to poliomyelitis was three times that of non-pregnant women.

Analysis of Maternal Deaths.

To return to the analysis of the 1948 to 1957 series, five of the eight deaths occurred in the nine pregnant women developing poliomyelitis in the 1948 epidemic. This mortality is highly significant ($P < 0.001$). The high mortality in this year is attributed, not to an extremely severe form of affection or a virulent virus, but to unpreparedness and inexperience in handling these cases, as this was the first severe epidemic encountered in this State.

Excluding the 1948 cases, in 22 cases from 1949 to 1957 inclusive three patients died, a mortality of 13·63%. This figure still compares unfavourably with the series of Horn (1955), namely, 5·2% mortality in 325 cases, but is better than the results quoted by Gifford and Hullinghorst (1948), namely, 19% mortality in 170 cases.

Bowers and Danforth (1953) found that the mortality was higher in the pregnant than in the non-pregnant female, McCord *et alii* (1955) and Hunter and Millikan (1954) considered that they were the same, whilst Priddle *et alii* (1952) concluded that the mortality was higher in the non-pregnant woman. After a careful analysis of her series of 325 cases, Horn (1955) concluded that there was no demonstrable increase of severity or mortality of the disease in pregnant women over non-pregnant women of the same age group.

Four deaths occurred less than one week after the onset of poliomyelitis. The other deaths were at inter-

TABLE II.
Analysis of Western Australian Cases.

Year.	Number of Cases.	Mortality.	Women of Age Group 15 to 44 Years.		Poliomyelitis and Pregnancy.	Mortality.	Fœtal Wastage.
			Number of Cases.	Number of Deaths.			
1948 ..	311	24	57	7	9	5	Total, 4 (2 died undelivered, 2 stillborn).
1949 ..	61	6	13	—	—	—	
1950 ..	57	5	12	—	—	—	
1951 ..	94	4	12	1	2	—	1 abortion.
1952 ..	37	2	7	—	—	—	
1953 ..	44	3	7	—	3	—	
1954 ..	436	4	112	1	6	1	1 abortion.
1955 ..	33	2	7	—	—	—	
1956 ..	401	15	148 (147 were in first 3 months)	5	11	2	Total, 6 (4 abortions, 1 neonatal death, 1 death undelivered). Salk vaccine clinic started July 12, 1956.
1957 ..	1	Nil	Nil	—	Nil	—	
Total ..	1475	65 (4·4%)	375	14 (3·73%)	31	8 (25·8%)	Total, 12 (3 deaths undelivered, 6 abortions, 2 stillborn, 1 neonatal death).

vals of one, two, five and eleven weeks after the onset of poliomyelitis. These time relationships are in accord with the expected deaths in poliomyelitis of non-pregnant women. Horn (1955) considered that mortality occurred in those with respiratory failure, and that this depended on the severity of the disease.

Of the six patients for whom details of parity are available, one was primiparous, two were in their second pregnancy, and three in their third pregnancy. In the eight patients who died, poliomyelitis commenced from the sixteenth to the thirty-second week of pregnancy inclusive. Five of these were between the twenty-sixth and the thirty-second week, two at the sixteenth week and one was at the twentieth week of pregnancy.

In the 24 cases in which the sex was known, 13 babies were male and 11 were female, which indicates an even sex distribution. Of the eight mothers who died, five had male babies, and two had female babies. This figure is not significant. Priddle *et alii* (1952) found that there was a preponderance of male fœtuses in mothers affected by poliomyelitis in the ratio of 11:8.

With one exception (a mother aged 39 years), all mothers who died were between the ages of 22 and 31 years, four of them being aged from 22 to 24 years.

It is interesting to note that in the two patients who died in 1956, death was preceded by convulsions resembling eclampsia, although the patients had good oxygenation and clear airways. In addition, they had developed albuminuria, hypertension and œdema. Horn (1955) states that the threat of toxæmia of pregnancy is an ever-present problem.

Half of the patients who die do so within a week of the onset of poliomyelitis, but this state of affairs also occurs in all other groups acquiring poliomyelitis. Parity is not significant in relation to deaths. Deaths are most likely to occur in patients acquiring poliomyelitis during the sixteenth to thirty-second weeks of pregnancy. There is a preponderance of deaths in mothers carrying male fœtuses (probably not significant). Although, as indicated above, death is most likely to occur in mothers aged between 22 and 31 years inclusive, this is not significant, as the majority of pregnant women are in this age group.

Fœtal Wastage.

Including abortions (6), stillbirths (1), neonatal deaths (1) and those who died undelivered (5), the total fœtal wastage was 12 (38·7%). The abortion rate (19·3%) is significantly higher than the figure given by Javert (1957), who considers that approximately 10% of all pregnancies terminate in spontaneous abortion. This agrees with the conclusions of Horn (1955). The stillbirth was a breech delivery at 33 weeks' gestation. The mother died two days later. A 26 weeks' fœtus that lived for three-and-half hours after post-mortem Cæsarean section represented the only neonatal death. In another case in which post-mortem Cæsarean section was performed, the fœtus was found to be already dead.

One may conclude that the fœtal wastage rate is higher than that occurring in normal healthy women, and the abortion rate is higher than the expected spontaneous abortion rate.

McCord *et alii* (1955) noted a fœtal wastage of 27·45%, Bowers and Danforth (1953), 33%, Priddle *et alii* (1952), 11·7%, Gifford and Hullinghorst (1948), 26%, and Hunter and Millikan (1954), 32%.

Fœtal Abnormalities.

There were three babies born with fœtal abnormalities. One had talipes, one exomphalos and one webbed hands and feet. This gives an incidence of 9·6%, a significantly higher incidence than the fœtal abnormality rate at the King Edward Memorial Hospital for Women, which was 2·22% over the last three years.

Trimester in which Poliomyelitis Occurred.

Most writers consider that it occurs more commonly in the first and second trimesters (Bowers and Danforth, 1953; Hunter and Millikan, 1954; McCord *et alii* 1955. Horn, 1955). Priddle *et alii* (1952) found that poliomyelitis was more common in the second and third months of pregnancy, Siegel and Greenberg (1955), in the third, fourth and fifth months.

In this series, the distribution appeared to be fairly even throughout pregnancy, namely, 11 cases in the first trimester, 8 in the second, and 12 in the third. Deaths (5) were most common amongst those contracting poliomyelitis in the third trimester.

Parity.

There were six *primigravidæ* and 18 *multiparæ* amongst those in whom parity was recorded. In confinements at King Edward Memorial Hospital for Women, the ratio of *primigravidæ* to *multiparæ* is 1: 2·8. Hence the parity is not significant in relation to the occurrence of poliomyelitis.

Weinstein and Meade (1955) and Siegel and Greenberg (1955) found that *multiparæ* were more susceptible than

primiparæ, and considered that this was due to the introduction of the poliomyelitis virus into the household by the other children.

Age Group.

At first glance at Table IV it would appear that the occurrence of 16 cases in the 20 to 24 years age group is significant. However, using the Null hypothesis, the age groups 15 to 24 years must be combined, bringing the ratio of pregnant patients with poliomyelitis to normal pregnant patients to 52:47, which is not significant. Hence the age distribution of pregnant patients with poliomyelitis closely resembles the age distribution in unselected pregnant women.

TABLE III.
Figures in the 1948 Epidemic.

Condition.	Polio-myelitis.	Non-Polio-myelitis.	Total.	Attack Rate per 100,000.
Pregnant	9	10,152	10,161	89
Non-pregnant ..	54	100,061	100,115	54
Total	63	110,213	110,276	57

Maternal Blood Group.

Anders (1955) states that individuals of group O seem more susceptible, although those of group A are more severely affected, and those of group B are less severely affected by poliomyelitis. He also found that comparatively more Rh-positive than Rh-negative individuals were affected.

The blood groups were recorded in only 11 cases in this series, and although the numbers are too small to draw any conclusions, they are included for interest in Table V.

TABLE IV.
Relation to Age Group.

Age Group. (Years.)	Pregnant Poliomyelitis Patients.			1000 Consecutive Hospital Deliveries. (Percentage.)
	Number of Cases.	Number of Deaths.	Percentage.	
15 to 19 ..	Nil	—	—	11
20 to 24 ..	16	4	52	36
25 to 29 ..	10	1	32	26
30 to 34 ..	4	2	13	15
35 to 39 ..	1	1	3	7
Over 39	—	—	—	4

Mode of Delivery.

There were six abortions, with one maternal death, and 15 spontaneous vertex deliveries, with one maternal death 12 weeks after delivery. One baby was delivered as persistent occipito-posterior, and there was one precipitate labour lasting only ten minutes. There was one breech delivery, which was preceded by surgical induction of labour at 33 weeks. The baby was stillborn, and the mother died two days after delivery. There were two forceps deliveries and one Cæsarean section.

Horn (1955) recommends Cæsarean section in case of severe progressive bulbar spinal disease (ten cases without maternal or fœtal death incidental to surgery) if a fœtal weight of over four pounds can be anticipated. Bowers and Danforth (1953) recommend Cæsarean section in cases in which there is respiratory embarrassment. However, Hunter and Millikan (1954) do not recommend Cæsarean section except for obstetric indications.

It is difficult to draw any conclusions about the mode of delivery in this Western Australian series. It did not seem that any deaths were related to the mode of delivery. Apart from a repeat Cæsarean section, there were no other cases in which Cæsarean section might have been helpful, as all the deaths were of patients of 33 weeks' gestation or earlier, except one who died 12 weeks after delivery at term.

Artificial rupture of the membranes was performed in two cases, in one of which labour was premature, with neonatal death and maternal death.

Poliomyelitis in the Puerperium.

In addition to the 31 cases already described, there were two patients who developed poliomyelitis in the puerperium. One patient delivered a still-born infant after a short labour in 1951. Death was ascribed to the umbilical cord wound tightly around its neck. She had symptoms suggestive of the prodomata of poliomyelitis just prior to delivery, and developed poliomyelitis five days after delivery. The other patient developed a mild attack on the twenty-sixth day after a normal confinement.

TABLE V.
Relation to Blood Group.

Blood Group.	Poliomyelitis Distribution. (Number of Cases.)	Normal (European) Distribution. (Percentage.)
A	4	41·0
B	Nil	8·0
AB	Nil	4·0
O	7	46·0
O, Rh-positive	5	38·4
O, Rh-negative ..	2	7·6
A, Rh-positive	4	34·2
A, Rh-negative ..	Nil	6·8

Types of Virus Responsible for Epidemics.

The virus in 1948 was not typed; in 1954 it was Brunnhilde Type 1, and in 1956 Leon Type 3. Serological evidence indicates that Lansing Type 2 (mainly non-paralytic) is widespread in this State. The nearest laboratory facilities for cultivation of the poliomyelitis virus were 2000 miles away. Poliomyelitis virus Leon Type 3 was cultured from the spinal cords of two patients who died in 1956. In one of these cases, the baby lived for three-and-half hours after post-mortem Cæsarean section, and cultures were attempted from its organs and fæces, but all failed to produce any growth.

Salk Vaccine.

A Salk vaccine clinic was started on July 12, 1956, at the King Edward Memorial Hospital for Women, in an attempt to vaccinate all pregnant women in this State. From that date, over 10,000 women have received Salk vaccine at this clinic alone. Since then, there have been no recorded cases of poliomyelitis and pregnancy. Wholesale Salk vaccination of school children was also started about the same time, and since then there have been seven patients admitted to the Infectious Diseases Hospital with poliomyelitis; four of these were males and one was a female in the 15 to 44 years age group, who was not pregnant. Two patients died, both males.

Subsequent Pregnancies Recorded.

Details have been obtained of six patients in this series who had seven further pregnancies subsequent to their attack of poliomyelitis. Six of these pregnancies were normal, one being a twin pregnancy, whilst in the seventh the baby had multiple congenital abnormalities.

Whilst analysing this series, details were noted of 26 patients (including the above-mentioned six) who had a past history of poliomyelitis (not related to pregnancy), and a total of 41 pregnancies subsequent to the attack of poliomyelitis. There were two forceps deliveries and two breech deliveries, one with forceps to the after-coming head. The remainder were spontaneous vertex deliveries. There was one neonatal death associated with multiple congenital abnormalities. Four of these labours took over 24 hours, 27 took less than 24 hours, and 16 less than seven hours. One may conclude from that that when a patient recovers from acute poliomyelitis, her outlook for future pregnancies is good.

Summary.

In this paper, an attempt has been made to analyse the data relevant to 31 patients developing poliomyelitis during pregnancy. Detailed reference has been made to an epidemic occurring in 1948, with a maternal mortality of 55%. From our own series, it would appear that poliomyelitis is no more likely to occur in the pregnant than in the non-pregnant. The cases have been analysed with regard to maternal mortality (25·8%), with detailed analysis of maternal deaths, fœtal wastage (38·7%), fœtal abnormalities (9·6%), sex of fœtus, time of onset of poliomyelitis (distributed throughout pregnancy), parity of patients (not significant), ages of pregnant patients developing poliomyelitis (majority 20 to 25 years), maternal blood group (not significant), mode of delivery (deaths probably unrelated), and types of virus responsible. In addition, two cases of poliomyelitis occurring in the puerperium are recorded, and reference has also been made to pregnancies occurring after poliomyelitis, both in patients described in this series (seven cases) and in other patients (26 cases). The effects of Salk vaccination on poliomyelitis in pregnancy have been mentioned.

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THE ATHLETE AND CHRONIC ILLNESS: AN ESSAY ON HUMAN POTENTIAL.[1]

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FOR the purpose of this paper, chronic illness can be defined as a state in which the patient, although ambulant and capable even of activity at athletic levels, nevertheless suffers some disease. To appreciate the fact that severe morbid change can occur without symptoms, one must understand the effect of the reserve capacity which every organ possesses. A simple example may be given. The output of the heart is 4·5 litres per minute at rest. This can rise to 30 or even 37 litres (i.e., eight gallons) on extreme exertion. If a slow chronic process so damages the heart as to make possible a maximal output of, say, 15 litres per minute, then this is adequate for rest and limited activity only. Only tests under conditions of load would reveal the defect, and it is for the physician to subject his patient to such loads before pronouncing his assessment of capacity of an organ. This ability to estimate reserve presents the most difficult aspect of interpreting chronic ill-health. This reserve could most aptly be called "human potential". It is to the problem of what constitutes "human potential" that we shall turn our attention in this paper. Because in chronic ill-health the morbid process of destruction is slow, amazing physiological adaptation becomes possible, and destruction may well reach critical levels before being recognized.

Many factors determine such physiological adaptation. The first of these is the variation of individual response to stress. Many examples may be given in which, from one person to the other, the same chronic disease process presents vastly different features. Incentive, morale, team spirit or the like may create a force of such strength as to overcome many difficulties. The drive to achievement resides mostly in the earnestness of the desire to accomplish the feat for the sake of the team or the ideal. Life abounds with examples of this sort. Can we find any better model of endurance than the challenge of Everest or the Antarctic experiences of Captain Scott? Appsley Cherry Garrard, in that magnificent epic "The Worst Journey in the World", speaking of Wilson of the Antarctic who, in his earlier life, suffered tuberculosis, wrote: "He was an ideal example that it is not strength of body but rather strength of will which carries a man farthest where mind and body are taxed at the same time to their utmost limit." And when John Landy in that amazing mile race said "I felt woeful until I heard the three-quarter mile time of three minutes, I thought then I must finish on and I was able", he was expressing the same thought. One heard often at the Olympic tests the coaches' comments: "For what might be a cold run, no one to extend him, it was a magnificent performance."

The healthy athlete so often demands the extremes of reserve that at times he may expect more than is possible and so become almost too health-conscious. Dr. R. Bannister recently stated that "athletes at times were essentially hypochondriacs, almost superstitious about their health, considering themselves and their training methods too seriously".

An attempt to estimate the factor of human potential is revealed in Clark Kennedy's investigations on "Human Reactions to Danger". He took as his testing material athletes training for major events, and showed that the human factors of diversion, humour, anger, loyalty, were all very trigger-like and easily upset in the highly trained. The basis of this could be ascribed to endocrine imbalance, and Kennedy considered that this was significantly affected by planned thought and length of training. Much evidence, in fact, exists that staleness may well be a fatiguing of the adreno-pituitary axis.

Psychological factors, incentive, even challenge must be taken into account in estimating an athlete's potential. Anyone studying human reactions will be aware of this, and Adam Lindsay Gordon recognized it when he wrote:

> No game was ever worth a rap
> For a rational man to play,
> Into which no accident, no mishap
> Could possibly find its way.

The many additional physiological factors which go to make up the potential capacity of an individual may be enumerated.

FACTORS AFFECTING THE ATHLETE'S POTENTIAL.

Vasomotor Make-up of the Individual.

Neurocirculatory asthenia presents as an easily recognizable pattern—fatigue, unduly rapid pulse, sweating, perhaps even tremor. Some people, constitutionally ill-

[1] Part of a symposium on "Health and the Athlete: Acute Infections and Chronic Illnesses", held by the Victorian Sports Medicine Association on May 16, 1956, at Melbourne.

adapted to competitive sport, nevertheless may, by incentive, so whip themselves into activity as to show many of the features of this condition. The expression of anxiety, extreme strain and pallor, the pinched features and rapid pulse so commonly seen at the end of a long race represent this vasomotor reaction. The important point is to recognize this state and not ascribe it to heart disease. However extreme such manifestations may be, even if to the point of collapse, one never observes any features of cardiac imbalance such as venous engorgement, liver enlargement or cyanosis. In the production of this syndrome nervous stimuli prior to the race play an important part; thus pre-race excitement, insomnia and, in university athletes, proximity of examinations are potentiating factors. In most cases it can be anticipated, and possibly by well-judged preparations the extreme vasovagal reaction can be avoided.

Heat Production.

The temperature may rise to 100° to 101° F. after strenuous exertion, while in humid conditions it may increase to even 106° or 108° F., with possible development of heat stroke. This particularly applies to marathon runners, and would present a special danger to anyone suffering from a low-grade chronic septic state. The reverse problem of cooling must also be considered. In a three-year study on the "Physiology of the Channel Swimmers", ability to endure prolonged immersion was associated with effective body insulation (related to subcutaneous fat) and effective heat production. Incentive also plays a large part in the ability to stand up to prolonged immersion. Whereas in the hopelessness of a shipwreck six hours of immersion usually prove fatal, in a channel race 18 swimmers, undergoing nearly identical immersion, finished on strongly and relatively undisturbed.

Age.

While resilience and elasticity make for an easier ability to call up reserves, experience and trained mechanical efficiency may more than compensate for this. Thus, even at 21 years, when development is complete, the athlete may require a further two years to train his muscles to the point of maximal efficiency. In some branches of athletics, in fact, maximum efficiency may come even in the late twenties or early thirties.

Conditions to Look for in Athletes.

With the above-mentioned factors qualifying the effects of morbid change in disease, what conditions are we particularly to look for in the routine examinations of the athlete? As an indication of the difficulties in assessing the health of the athlete, John S. Condon found it necessary to carry out the following minimal check in the analysis of some 920 athletes: (i) medical history, (ii) physical examination, (iii) investigation of the urine, (iv) X-ray examination of the chest, (v) electrocardiography. By so doing he discovered, among people regarded as athletically fit, five cases of early infective arthritis, two cases of long-standing rheumatic fever, one disk lesion, and one case of chest pain on extreme exertion, in which *T* wave changes in the electrocardiogram appeared only after extreme exercise. It is interesting to note, in passing, that many athletes were temporarily suspended because of acute infections unrecognized until the time of examination.

In their attempt to maintain a full health check on their competitors, the London Amateur Boxing Association have a very carefully planned scheme of medical review, insisting on full examination, exercise tolerance and pulmonary efficiency. A booklet is kept by the contestant containing records of traumatic incidents in each fight. In each case the search is for potential as well as for actual ill health.

What, then, are we to look for? This may be divided into the following categories.

Chronic Morbid Change in the Cardio-Vascular System.

The breaking point in the healthy individual taxed to full load is never the heart, but the blood supply reaching the limb muscles. When this breaks down, further limb activity becomes impossible. Because of this "safety" mechanism, a healthy heart cannot be over-taxed physically, and the term "athlete's heart" is a misnomer and probably represents a variation of neurocirculatory asthenia as already described. Three true cardio-vascular disturbances of long standing may, however, be found in the apparently "healthy" athlete: (*a*) enlargement, (*b*) valve disturbances, congenital and acquired, and (*c*) hypertension.

Enlargement.

Many statistics for insurance, comparing the life span of athletes, appear to show that certain types of athletic activity—for example, rowing—are associated with greater longevity. However, such analysis most often fails to take into account such factors as the extra care such groups exercise as a team, the stricter crew discipline, etc. Furthermore, much statistical evidence of heart enlargement fails to accept a common standard base line from which measurement can be made. There exists one well-authenticated report of a man, in his youth the greatest long-distance cyclist of his day, and throughout life excelling in hockey, cricket, tennis and swimming, who at his death from a malignant thyroid tumour at the age of 78 years, was found to have a grossly enlarged heart weighing 18 ounces despite a normal arterial system—a true example of cardiac hypertrophy. From experience it seems that if enlargement was the only finding, it would be unwise to forbid light sport; one would, however, be inclined to advise against intensive athletic activity unless proof beyond doubt existed that such activities had no adverse effect (return of the pulse rate to normal within a short time of exertion, no undue dyspnœa or cyanosis).

Valvular Lesions.

The ambulant state of a patient with valvular disease is dependent upon the state of balance struck between the left and right ventricle. Provided such balance can be maintained, function remains satisfactory. The balanced state may exist even in the presence of gross enlargement, and physical findings therefore must be taken within the context of total cardiac function. The ease of production of imbalance in the presence of cardiac disease varies tremendously with each individual. The ability of the heart to carry on is sometimes amazing, and there has been reported the case of a marathon champion of Great Britain who, while at the height of his running career, suffered aortic regurgitation and mitral stenosis.

In one case of my own, a patient, while suffering severe aortic regurgitation, looked robustly well and carried out his occupation as a circus strong man, pulling a heavy motor vehicle with his teeth. The condition proved suddenly fatal 18 months later.

True valvular disease makes cardiac imbalance (a term preferred to cardiac failure) more likely, and a person with such a condition should not be allowed extremes of effort. This is by no means to forbid all physical or athletic activity; but particular care should be exercised in relation to those lesions which may affect the left ventricle. Aortic lesions and mitral regurgitation, being common, are of special significance. In either type of case the subject may appear fit, yet may produce left ventricular insufficiency suddenly and without much warning.

It is interesting to contemplate the exact mechanism of breakdown in long-standing valve lesions. In a recent case in which mitral valvulotomy proved necessary, the patient claimed that up to the time of his breakdown, a few months before his admission to hospital, he was able to carry 156 pound loads from ship to loading vehicle some eight to twelve times per hour. In an eight-hour shift this represents the lifting of some four tons per day. During this period he was also able to participate actively in sport. His valve lesion was of at least twenty

years' duration, and no physical change in the heart, as such, seemed to have precipitated his breakdown.

Hypertension.

The finding of hypertension on routine examination of the athlete would have to be assessed in relationship to other observations—heart size and renal function. In this assessment, standards of blood pressure should be accepted critically. While a fluctuating systolic blood pressure may perhaps be ignored if it is not too extreme, not so the raised diastolic pressure. When raised blood pressure presents as an isolated sign, coarctation of the aorta must be excluded. In conditions originating at birth, adequate time for effective adaptation has occurred, and so symptoms are few or absent. In this regard the two most silent of congenital lesions with possible advanced morbid change are coarctation of the aorta and the congenital cystic kidney. In fact, the first patient with coarctation of the aorta whom I encountered, many years ago, suffered a cerebral seizure while on the football field.

Because blood pressure rises physiologically with exertion, an added rise over and above the high starting point may well prove dangerous. Hypertensive patients should not take part in severe forms of activity. The completely "well" hypertensive is well known; but the athlete who at rest presents with a tell-tale diastolic pressure near or above 100 mm. of mercury and a facile systolic pressure should always be subjected to tests after exertion. If after activity there occurs a persistent rise of more than 50 mm. of mercury in the systolic pressure and 15 mm. in the diastolic, then avoidance of sudden calls on reserve should be advised. Even if the athlete so tested presents "nervous" symptoms, it is not wise on this excuse to ignore the potential danger that the make-up of this type of individual presents to himself.

Chronic Renal Disease.

As in heart disease, the slow, gradual process of renal destruction, by allowing compensatory mechanisms to come into play, is very insidious and not readily recognizable. The significant types of problem are (*a*) albuminuria, (*b*) the cystic kidney, (*c*) chronic nephritis, especially pyelonephritis.

Albuminuria.

Transient Albuminuria.—That violent exercise produces some albuminuria was first noted by Dukes and Collier at Oxford. Such albuminuria may well fall into the category of the "orthostatic", "adolescent", "functional" or "physiological". Probably it is due to vasomotor instability of the renal vasculature rather than to true renal disorder. Even hæmaturia has been described as of anoxic origin and therefore as a physiological response to exercise. All such explanations should, however, be accepted with great caution, and then only after elimination of organic disease.

Permanent Albuminuria.—Permanent albuminuria should bar severe athletic activity, for the change in body surface temperature to which the renal vasculature is particularly sensitive may prove dangerous. When repeated tests reveal albuminuria, microscopic examination of urine after exertion is an essential test, while a focal source of infection must be carefully excluded. Renal function tests, particularly urea clearance, may reveal a deficient kidney in such cases.

The Cystic Kidney.

Because of its long duration, polycystic kidney is one of the most silent of all diseases. Symptoms are discovered only on routine examination or after some sudden renal episode—hæmaturia or the like. The following case is an example.

A man, aged 32 years, was admitted to hospital with sudden hæmaturia, which had developed at the interval in a football game. He had always been in good health and had participated in active sport. He proved to be in an advanced state of uræmia from bilateral polycystic kidneys. Adolph Abrahams quotes the reported history of the "Iron Man of South African Rugby Football", who died during a game, and was found to have congenital cystic kidneys, hypertrophied left kidney, enlarged heart and atheroma. It is not for this paper to describe the detailed findings in this group, but a few red corpuscles and pus cells in the urine and a tell-tale slight hypertension may give the clues. The palpable kidney on routine examination may be the only sign.

Chronic Pyelonephritis.

Chronic pyelonephritis produces very insidious renal destruction, and if it has been developing from early life may cause few symptoms.

A patient, aged 21 years, about to go abroad, presented with slight right-sided pain, for which some six months previously the appendix had been removed. This did not relieve the pain, and so he sought further advice. He participated in active sport and was otherwise well. He had slight pyuria and a blood pressure of 156/102 mm. of mercury. Renal function tests revealed an 18% urea clearance. Interrogation about a scar in his neck disclosed that as an infant he had had a severe throat infection—"Ludwig's angina", with abscess formation needing incision. A diagnosis of advanced renal destruction from pyelonephritis originating in early life was made. Twelve months later, while abroad, he suffered a sudden deterioration of health, and died within a few weeks. Autopsy confirmed the presence of advanced renal destruction from pyelonephritis, the kidneys weighing under one ounce each.

In the majority of subjects in this group, evidence of chronic focal sepsis, tonsillar or dental, with cervical adenitis may be found.

Chronic Sepsis as an Isolated Finding.

Chronic sepsis may well be one of the most significant causes of poor performance in the athlete. Except to emphasize that it is so often overlooked, it is not necessary to elaborate the story of chronic tonsillar or dental sepsis; probably these may be regarded as number one destroyers of good athletic prowess. There is nothing more difficult to assess than the small infected tonsil. Tucked away under the faucial pillars, it appears deceptively innocent, and may sometimes be identified only by the syndrome it produces. Recurring episodes of fibrositis, obscure fevers, undue languor or fatigue may all arise from tonsillar or dental sepsis, and when such a history is obtained, the search for a source in these areas should be meticulous. In this search estimation of the erythrocyte sedimentation rate, a leucocyte count, cultural examination of throat and nasal swabs and estimation of the antistreptolysin titre may all be necessary. The septic state may affect a heart under severe strain more than any other factor, and chronic tonsillar or dental infection ranks with nutritional deficiency as a major cause of lack of stamina and fatigue. Recognition and correction of this factor may make just that difference between the 4·6 and 3·59 minute mile. The effect of sinusitis and hay-fever may sometimes fall into the same category.

Chronic Nutritional Deficiency with or without Alimentary Lesions.

In the field of nutrition, perhaps we have one of the most important causes of below-standard health. In conformity with world dietetic opinion, it is to be realized that *the dietetic history alone gives no real clue to the state* of nutrition. In this discussion, malnutrition is therefore not synonymous with starvation. Probably the only true guide to subnutritional states is undue fatigue and below-weight states based on height weight standards. Spies, in his book *"Rehabilitation by Better Nutrition"*, confirms this approach with the comment: "It is not sufficient that a person has access to adequate food. It must be prepared, sufficient in amount, and all necessary constituents must be ingested and absorbed." The athlete may present with fatigue, lack of stamina or a feeling that all is not well despite normal physical findings. Everyone recognizes that the underweight athlete breaks down at the point of extreme demand. The effect of transient illness, febrile

episodes, etc., is to reduce food intake temporarily. This presents an important cause of interference with adequate utilization and absorption of food. Because the rate of utilization and demand in the athlete are increased, states of relative nutritional deficiency may thereby more easily develop. Minor disturbing episodes of ill-health, which are of no great consequence to the average person, may be of great significance to the athlete. The most important symptom is one which is not measurable by even the most careful of investigations; it is fatigue. Fatigue is an indication of nutritional failure (or sepsis). Thus any disease associated with anorexia should be efficiently corrected by a diet of high protein and low fat content, a point worthy of special attention. To ensure a high protein absorption, consideration should even be given to vitamizing or pulping a grilled steak prior to the big race. This saves much work on the part of the gastro-intestinal tract, and ensures full utilization and absorption of the materials supplied. May the ready availability of meat in Australia account for the nation's better athletic prowess?

As protein is necessary in preparation for intensive effort, thiamine and riboflavine may be used as dietetic supplements, and in special circumstances when fatigue is excessive, even parenteral use of these materials may prove valuable. More important than, or equal in importance to, missed sepsis, subnutrition in the finely-trained individual is of tremendous significance. It is my belief that the extra stamina needed for the last few yards may well come from this source.

Chronic Lung Disease.

Reduced vital capacity is an unusual problem in the athlete, as it obviously limits exertion. However, moderate emphysema may cause some limitation of performance. The possibility that a tuberculous infection may be lighted up by excessive activity is also often stated, but not so often proven. Routine early chest X-ray examinations would reveal any morbid condition in the pulmonary field. Recurrent pneumothorax may sometimes be responsible for limiting physical activity, but this seems a self-limited disease. Asthma, strictly not to be regarded as a disease of the lung, may reduce vital capacity sufficiently to affect stamina and reserve. Exercise is sometimes beneficial for this condition; but the nervous factor of competition could well trigger off an attack. Asthma does not preclude athletic activity, but each case must be judged individually.

Endocrine Changes.

Low-grade thyrotoxicosis may cause loss of weight and fatigue, yet may easily be overlooked. It is perhaps commoner than is realized, and could account for vague unrecognized poorness of performance. Closely allied to the manifestations of neuro-circulatory asthenia, it may erroneously be regarded as such.

Diabetes.

Well-stabilized diabetes does not debar sport, and as is well known, certain Davis Cup players have suffered this disease. Stabilization is sometimes rendered difficult by extremes of activity, but if the disease is intelligently controlled, activities of any calibre are possible. Constancy of weight is perhaps the best guide to stability in this disease. The diabetic athlete whose weight varies should give up strenuous sport until constancy of weight is achieved.

Anæmia.

Minor degrees of anæmia may reduce stamina in the apparently healthy athlete, and should be kept in mind. The condition may link up with nutritional disturbance and change in weight, or be found as an isolated manifestation.

Conclusion.

In conclusion, one cannot leave this subject without reemphasizing the significance of team work in athletic performance. The team spirit, by its demand on discipline and restraint, builds character and provokes greater effort. The urge never to let the team down introduces a challenge, and this constant sense of challenge may well be the greatest incentive for human endeavour: "To strive, to seek, to find, and not to yield."

Excessive rest may more rapidly cause wasting than activity, and even in chronic illness the balance between activity and rest must always be maintained. We tend still to keep patients at bed rest too long, and it is perhaps opportune to draw attention to this in all conditions where reserves are reduced; chronic disease and geriatric problems at once come to mind.

Goldsmith, when he wrote the couplet

> To husband out life's taper to the close
> And keep the flame from wasting, by repose

placed too much emphasis on rest; the opposite may be a greater truth. The last line may well be paraphrased to read:

> And keep the flame from wasting by repose.

The judicious maintenance of activity in the presence of disease states is of great importance when such a state is found in the athlete. It is for the physician to advise, perhaps correct, but not necessarily to forbid sport. The most important thing is to recognize the disturbances of insidious and latent type, the effect of which could be significant either on athletic standards or on the welfare of the individual.

Summary.

1. The athlete presents an important field of investigation on the assessment of human potential.

2. A survey is here presented of the effect of chronic morbid change on the potential of an individual.

3. Certain physiological changes, normal in themselves, may play havoc in those suffering latent chronic disease.

4. Assessment of the athlete's fitness must take such state of affairs into existence.

5. The important diseases in this regard are: (*a*) Morbid changes in cardiovascular system—enlargement, valvular disease, hypertension; (*b*) chronic renal disease—albuminuria, polycystic kidney, pyelonephritis; (*c*) chronic sepsis; (*d*) chronic nutritional deficiency; (*e*) anæmia, lung disease, diabetes, and thyroid disturbance.

6. Incentive and team work play a large part in overcoming existent defects in the athlete.

SPORTS INJURIES.[1]

By Leigh T. Wedlick,
Melbourne.

In certain European countries attention is focused on sports injuries, which are regarded as a specialized form of injury, and, in fact, special clinics and hospitals are devoted entirely to the treatment of such injuries. Since the injuries that occur in sport may occur also from other causes, it may be asked what reasons can be advanced for such specialization in sport injuries. In this age of specialization, many may feel that such segregation of sports injuries may be unnecessary. There are, however, certain aspects of sport injuries which merit particular attention.

To many people sport means competitive sport, and the development of the outstanding athlete; and it would be foolish to ignore the publicity value to a country of outstanding athletes. Furthermore, the striving for supremacy results in better performance, even if the ultimate goal is not attained. Let us not forget, however, the large number of sport participants who fail to reach top standard. Their efforts are not wasted, and

[1] Read at a combined meeting of the Victorian Sports Medicine Association and the Victorian Olympic Council on May 7, 1959, at Melbourne.

their work is just as important. The greatest value of sport is in raising the general standard of physical and mental health in the community and it is an invaluable positive health measure. If it is to be consciously used in this way, then it becomes important to pay due attention to the prevention and treatment of sport injuries.

Some sports have hazards peculiar to themselves—e.g., brain damage in boxers, head injuries in cyclists, fractured legs in skiing.

The treatment of sports injuries is peculiarly difficult because of the tendency, particularly in competitive sport, to return to activity before recovery is complete. The pressure for such premature resumption of sporting activity comes not only from the athlete himself, but even from the club, and must be resisted at all costs. Such premature resumption of activity before recovery is complete only leads to further trouble and prolonged disability, which is harmful, not only to the athlete, but to the club itself. It should be realized that it never pays to play unfit men.

The most important aspect in treatment is, of course, prevention; and there are several steps that should be taken in this direction.

Medical examination of the athlete to ensure good physical and mental health is ideal. It should be carried out before sport is embarked upon. It is well known that the healthy heart is practically invulnerable; but the presence of disease or infection completely alters the picture. Professor la'Cava of Rome believes that foci of infection can not only delay recovery from injury, but may easily predispose to such injury. Medical examination therefore in sporting activity can be valuable. Boxers can best be protected by constant medical supervision, to ensure they do not carry on to the point where serious injury may result. A sudden deterioration in performance is often noticed by the trainer or coach and this may be a sign either of mental staleness or of some complicating medical factor, such as the onset of infection or disease. It is not at all uncommon for such sudden deterioration in performance to occur during the initial stages of infection.

In training, correct graduated conditioning of the athlete is of the utmost importance, whether the athlete is a child or an adult. (No one would advise the middle-aged individual suddenly to embark violently on playing squash and we all know that the "old buffers'" race provides many patients for the doctor.) Such graduated physical training of the athlete builds up physical fitness. It results in increased cardio-vascular efficiency and in increased neuro-muscular coordination. Weight-lifting exercises are valuable in many cases to build up strength of the extensor muscles of the back, and this forms a natural splint to give protection against back injuries.

The teaching by the coach of correct techniques of sport is important, because an unorthodox or jerky style will increase the risk of injury.

A preliminary "warming up" before competition not only improves the efficiency of the cardio-vascular system, but promotes neuro-muscular coordination and rhythm.

Correct apparatus and safety precautions should be adopted. Faulty javelin poles can lead to trouble. Cyclists should wear skull caps, boxers should wear efficient gloves to protect them against serious injury. In jumping events, particular care should be taken to see that the landing is not made on hard ground. All these preventive measures are common sense; but they do merit close attention.

Treatment of the Injury.

Prompt medical examination is essential. This is usually provided for serious injuries such a fractures and dislocations; but it is often delayed in the so-called less serious injury, particularly the group of musculo-tendinous lesions. These musculo-tendinous injuries are often rather neglected at the start, and in the long run turn out to be more trouble than the so-called serious fractures and dislocations. Prompt medical examination is desirable to ensure an accurate diagnosis and an understanding of the pathology. Only too often, the footballer who receives a blow in the thigh, with the development of effusion of blood into the muscles of the thigh ("cork leg"), is put straight under the heat lamp and pummelled by a "rubber". This is completely wrong where there is tearing of muscle and effusion of blood; it should be clear that the application of heat and rubbing are only likely to increase the damage. The most important treatment, therefore, should be rest and perhaps the use of a pressure bandage. This should be the treatment for 24 to 48 hours, until risk of further bleeding has vanished. After this rest period, careful physical therapy becomes of importance.

If no treatment is given and œdema or extravasation of blood is allowed to persist, then there may develop fibrosis and adhesions, which lead to further trouble; this is also aggravated if active movement is not carried out. Physical therapy should therefore be instituted—heat with a little massage to ease pain and muscle spasm, and careful graduated active movement to ensure that stiffness does not develop in affected joints. This must be done carefully, because if it is carried out too vigorously, damage may be done to the tissues which are beginning to heal.

Apart from the graduated active exercises to increase range of movement, it also becomes important to give graduated resistance exercises to obtain full muscle power. The type of heat used will depend on the lesion. Infra-red irradiation is sufficient if the lesion is superficial. If we wish the heat to penetrate further into the body than an inch or two, it becomes necessary to use short-wave diathermy. Ultrasonic irradiation has a selective heating effect on tissue interplanes, and is therefore of particular use in the treatment of lesions of tendons and tendon sheaths. Injections of "Novocain" and hydrocortisone may be valuable in these cases, particularly in the tennis elbow and the painful heel. Not infrequently there is a painful reaction for 24 hours after hydrocortisone has been given, and for this reason it is not uncommon to mix "Novocain" with hydrocortisone to try to minimize this reaction.

Full sporting activity should not be resumed until recovery is complete, as evidenced by freedom from pain, full range of movement, and full muscle power. When sport is resumed, it should be resumed gradually and not abruptly. If the athlete resumes full sporting activity before recovery is complete, he does further damage. The condition tends to become chronic, and he may be off sport for weeks or months. We all see the patient with the sprained ankle which is allowed to become chronic and it may take months to recover. This can be prevented by prompt and efficent initial treatment. In some cases the period away from sport may have to be prolonged, and this is notable in the case of the javelin elbow, a particularly refractory condition, which may be very slow to recover. Even though it is slow, it is common sense that if the javelin thrower traumatizes the injury, he has only to suffer in the long run. It is far better to have one month away from sport with a sprained ankle and to obtain full recovery, than to return to sport in one or two weeks, repeatedly breaking down with further trouble.

If active movement is not carried out, and if measures are not taken to resolve œdema and extravasation, lack of active movement is likely to lead to fibrosis and adhesions which limit the range of movement. If the athlete returns to active sport, he is then likely to suffer from recurrent pain. The development of these adhesions can be prevented by efficient early treatment. If adhesions are allowed to develop manipulation followed by active physical therapy may become necessary to recover and maintain full range of movement. If full muscle power is not recovered before resumption of activity, then again there is likely to be trouble, in knee injuries particularly. It is vitally important to ensure full power in the quadriceps muscle and to try and to protect the knee against further injury.

EXTENSIVE ADAMANTINOMA AND OTHER TUMOURS OF THE JAW.[1]

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JUST as the grower of orchids is everlastingly fascinated by the culture of these beautiful plants, which grow so prolifically in these lovely islands and provide such beauty and interest, so do the students of the odontomas have a fascinating and absorbing study, and in addition to this the surgeon has the frustrating problem of the malignant tumour of the jaw, either arising primarily therein or secondarily invading these complicated structures.

In order to understand the origin of the epithelial tumours and tumour-like malformations of the jaw, it is necessary to have some knowledge of the development and fate of different parts of the dental lamina. Two distinct embryonic tissues give rise to the compound structure of the tooth. They are as follows: (i) the enamel cap; this is an epithelial derivative of the dental lamina which grows from the lining of the embryonic buccal cavity into the substance of the jaw; (ii) all other parts of the tooth—namely, dentine, cementine and pulp; these are derived from the embryonic mesenchyme.

Through the fifth week of embryonic life, the bud of dental lamina grows into the mesenchyme of the jaw. It becomes constricted at its crown and indented at its base by mesenchyme, which respectively and subsequently forms the enamel cap on the one hand, and on the other dentine, cementine and pulp. The cap consists of three layers: (i) the internal enamel organ, a layer of tall columnar cells or ameloblasts in contact with the papilla; (ii) the external enamel organ, a superficial layer of small cuboidal cells; (iii) an intervening zone of shrunken epithelial cells, connected by processes, and separated by clear intercellular fluid, forming the stellate reticulum or enamel pulp.

It is not proposed to discuss at length the fate of the various layers and structures of the teeth; but suffice it to mention certain accepted facts leading to the formation of the tumours under discussion. Those of importance appear to be as follows. The layer of ameloblasts produces the enamel of the developed tooth, the rest of the enamel organ persists as paradental epithelial residues, and epithelial residues of the dental lamina persist as rounded cornified islands or epithelial pearls, and it is from these various epithelial residues that epithelial tumours and cysts within the jaw arise. The dentine of the tooth develops through a layer of specialized mesenchymal cells, the odontoblasts, at the periphery of the dental papilla adjacent to the ameloblasts. Epithelial residues of the enamel organ and of the dental lamina are plentiful around unerupted teeth, and it is easy to believe that nutritional or inflammatory disturbances can produce proliferative changes or cyst formation and evolve overgrowth or dislocation of enamel, dentine or cementine.

Classification of the Odontomas.

The older accepted classification of odontomas as described, for example, by Bland-Sutton, was as follows:

1. Epithelial odontomas from the enamel organ.
2. Follicular odontomas
3. Fibrous odontomas
4. Cementomas
5. Compound follicular odontoma

(2–5: From the tooth follicle.)

6. Radicular odontoma from the papilla.
7. Composite odontoma from the whole germ.

Modern pathologists regard this as needless elaboration, and Willis declares that the only essential subdivisions are as follows:

1. "Adamantinoma" or "ameloblastoma", a true neoplasm derived from the epithelial residues of the enamel organ. This was the old epithelial odontome, an obsolete name. However, Willis states that these terms are unnecessary, as the tumours do not aries from ameloblasts and do not form enamel.

2. Intra-alveolar epidermoid carcinoma. This is a squamous-cell carcinoma arising in the substance of the jaw, unconnected with the epithelium of the gums. Its source is probably squamous-cell residues of the dental lamina rather than the residues of the tooth.

3. Odontomas. These are benign tumour-like formations in which occur varying mixtures of tooth tissues proper—enamel, dentine and cementine.

4. Epithelium-lined cysts. These represent disturbances or developmental malformations, often connected with unerupted teeth, malformed or malerupted teeth and supernumerary teeth and denticles. Radicular odontomas are related to these, and inflammatory cysts, sometimes known as "dental cysts" and to the dentist often as "root abscesses".

Characteristics of the Adamantinomas.

Adamantinomas usually occur in young people, the average age being 30 years, but 70% occur in people aged between 10 and 35 years. They may occur in infancy, and rarely occur after 50 years. They usually are of slow growth, but may grow rapidly. Males and females are affected equally often, and 84% of the tumours occur in the lower jaw.

The typical structure is that of well-defined clump of cells, of tall columnar type, with nuclei away from their bases, and much of the open meshwork resembling the stellate reticula of the developing enamel organ. Fluid accumulation in these spaces may give rise to small or large cysts. In some cases the structure may resemble the basal-cell carcinoma of the skin, and other portions squamous-cell carcinoma with even pearls of squamous cells. Old areas show gross cystic changes and hæmorrhage, and even patchy calcification and unerupted teeth may be present in fragments of bone.

The tumours tend to distend, invade and destroy the jaw. They are all malignant and locally invasive and tend to recur, but it is not usual to find metastasis to the neighbouring lymph glands, although this sometimes occurs.

Report of a Case.

Mr. A. was first treated at the Royal Adelaide Hospital at the age of 24 years, and the date of his first admission there was November 21, 1934. At that time he complained that he had a recurrent lump in the left side of the jaw between the teeth and the cheek. He had had this removed some time previously, but it had come back. On examination of the patient, there was a small lump the size of a walnut on the outer side of the left lower alveolus. It was considered to be a recurrent dental cyst and was removed. The cavity was packed with iodoform gauze, the operation being performed under intratracheal ether anæsthesia. He was discharged from hospital two days later, with instructions to report to the out-patient department for follow-up treatment.

Records of him are not available from that time on until he was readmitted to the Royal Adelaide Hospital on April 15, 1940, when he alleged that he had a lump in the left side of the jaw, present for one year and gradually increasing in size. At that stage he stated that he had had five previous operations on the lower jaw. On examination of the patient, the relevant feature was that there was a tumour on the left side of the lower jaw, firm in texture, apparently expanding the mandible. He was considered to be suffering from fibrocystic disease and was operated upon. An incision was made from the mid-line beyond the angle of the jaw, and the expanded portion of the bone was excised. A portion of cyst attached to the mass of the muscle was dissected from this. The cyst lining was removed by dissection and curettage. The macroscopic pathological findings at that stage were that there was a cavity extending almost to the mid-line, the jaw was expanded at the angle and there was a fracture in the region of the neck of the mandible. The microscopic findings were that he had a squamous epithelium-lined cyst of the lower jaw. He was discharged from hospital

[1] Read at the Seventh Congress of the Pan-Pacific Surgical Association, Honolulu, November, 1957.

about a week later, and advised to report back for follow-up treatment.

His history from that time is not clear, but no doubt he did report back to the hospital from time to time; however, the records of that institution were inadequate, so that it was not possible to trace him. He was ultimately sent to me for private consultation on May 25, 1956, by Dr. Esmond West. He was then aged 45 years, and he informed me that he had had his first operation for cyst of the lower jaw over 20 years previously and the last one 15 years previously, but the cysts had progressed and one had burst about three weeks before he consulted me and had continued to discharge. He was not suffering any pain when I saw him, but had suffered considerable pain when the cyst burst. He was otherwise well except for some trouble with his stomach, the symptoms leading one to believe that he probably had a peptic ulcer.

On examination of the patient on that occasion, it was found that there was extensive cystic disease of the lower jaw extending almost to the right ascending ramus. The left horizontal and ascending rami had been removed in previous operations. X-ray examinations were carried out, and these showed that he had extensive degenerative cystic disease in the remaining part of the lower jaw. Consultations were held with the dental authorities, and it was decided to remove the remaining portion of the diseased jaw up to the ascending ramus of the right side, and to replace it with a stainless steel prosthesis. It was thought that the disease was extending, inexorably, and that the giant cystic masses present would become infected with the passage of time and the problem would become more difficult when that happened. Advice was sought from various authorities competent to give advice upon this condition. A letter was sent to the Plastic and Jaw Unit, Rooksdown House, Basingstoke, Hampshire, for personal advice, and the following reply was received from Mr. N. L. Rowe:

> Mr. Holdsworth, who is shortly going on leave, has handed me your letter. He asks me to thank you very much for your kind interest and has suggested that I might, as joint author of the paper to which you refer, be able to help with regard to your query.
>
> We were both very interested in the extremely difficult problem of oral surgery which you described. We cannot recollect a case of total reconstruction of the lower jaw by means of a prosthesis which has been carried out at this hospital. A few patients have had a total reconstruction of the lower jaw following loss through malignant disease or gun shot wound, but this has been carried out by means of bone grafts from the iliac crest. The results in such cases have been reasonably good from a cosmetic point of view but rather inadequate from a functional aspect. I recollect reading of a case which was operated upon in the States where the entire lower jaw was removed through an intra oral approach and was immediately replaced by means of a prefabricated Vitallium prosthesis and the authors reported a satisfactory result over a period of about fifteen months. I regret that I cannot give you the exact reference at the moment but I believe that the article appeared in either the "Journal of Oral Surgery", or "Oral Surgery, Oral Medicine and Oral Pathology" about four years ago.
>
> I think that the success of either a serial bone graft or a metal prosthesis depends to a very great extent upon the vascularity of the tissues in which the graft is embedded. An autogenous iliac crest bone graft would probably have the best chance of success, but if this is not a feasible proposition for any reason, then a Vitallium or Tantalum and acrylic prosthesis should have a reasonably good chance of being tolerated provided, as I have mentioned, that the surrounding tissues are well supplied with blood and the soft tissue covering of the metal is reasonably thick and will withstand the tendency towards fibrous contraction which always occurs around the periphery of the implant. It is undoubtedly advantageous to build up a prosthesis in a lattice form as this will provide adequate strength with a minimum amount of foreign body metal whilst at the same time providing interstices through which repair tissue may proliferate and thus enmesh and anchor the substitute lower jaw.

Advice was also sought from Dr. John J. Conley of the Pack Medical Group, New York, and the following reply was received:

> I was most interested in the appropriate questions you detailed concerning your particular case of adamantinoma. May I answer your specific questions first and then add a few subsequent comments.
>
> It is reasonable and safe to implant an appropriately modelled metallic implant. The patient should be able to control the tongue and face if the implant fails and has to be removed at a subsequent date. I have implanted quite a few metallic prostheses associated with screws and wires made of vitallium primarily (also stainless steel and tantalum) in the past ten years. At some time in the post-operative course I have been obliged to remove a large percentage of these inert compounds. I wrote an article which was published in the "Journal of Plastic and Reconstructive Surgery" that you might find interesting, and I am enclosing a copy for you.
>
> Some of the basic criteria are that none of the intra-oral mucous membrane tissues or skin externally can be closed with any tension over an inert compound. If this law is compromised, the compound will gradually externalize itself. Therefore, the planning of your new prosthesis should be somewhat smaller than the size of the mandible removed, in order to eliminate the phenomenon of tension and accomplish an abundant, generous, relaxed covering. Naturally the tissue bed should be healthy as the presence of infection or intensive post-irradiation fibrosis will again defeat the technique. I prefer the serrated and perforated, rather flat type of metallic prosthesis to eliminate the dead space phenomenon. Fixing it to the residuum of the contralateral ascending ramus of the mandible that you will preserve, will require some ingenious thought on your part. Wires are ordinarily not satisfactory as they loosen. Screws, flanges, etc. are superior. In order to augment your rehabilitation with a maximum effort for esthetics and also restoration of functional capacity, I believe it would be wise to try to identify the masseter muscles, the internal pterygoids, the mylohyoid, geniohyoid, platysma, etc., bilaterally and hook them in the perforations and serrations of the metallic prosthesis. Special attention will, of course, have to be paid to the hypoglossal nerves and also the facial nerves, but this should not be too tedious.
>
> Post-operatively you can expect a considerable amount of persistent and stubborn edema which will gradually resolve.
>
> After all this care and planning, thought and hope, your patient may be one of the unfortunate ones and not tolerate the implant. This is a rather depressing experience for all concerned and I believe it is one that it is well to be prepared for. If the prosthesis remains in for a period of months, however, you have accomplished a certain amount of conformity and even when the prosthesis has to be removed because of presentation, you may be able to use the same tissue bed for the implantation of an autogenous bone graft taken from the crest of the ilium or using two ribs. If you have difficulty in having a factory tool up vitallium or stainless steel for you for the prosthesis, you might consider making one out of tantalum wire mesh of strong qualities modeled in the shape of a soft E with appropriate angles and conformities. As far as creating a new joint on the side that was operated twenty years ago, try not to be optimistic. As to the best of my knowledge, God is the only one who can accomplish anything anywhere near satisfaction in dealing with this joint space.

After I had received all this information and made a study of the literature and consulted our dental authorities and an industrial organization known as Oke Precision Products Limited, Adelaide, who are skilled in the manufacture of a variety of stainless steel products, it was decided to remove the remaining portion of the patient's diseased lower jaw. He was admitted to the Royal Adelaide Hospital on March 27, 1957, for this purpose. He then gave the history that he had had what was called an adamantinous cyst removed from his lower jaw in 1931. He had had many recurrences and frequent excisions, the last being in 1943, when he had had a partial excision of the left lower jaw; but shortly afterwards he had suffered from a further recurrence, which had since grown very large. He also suffered from a peptic ulcer. On examination of the patient, the salient points were that the left ascending ramus and part of the mandible were absent. The remaining portion of the mandible was expanded into a hard mass not attached

to skin. A cystic swelling measuring about two inches by one and a half inches was present on the left end of the expanded jaw and also visible on the floor of the mouth. There was a scar on the skin over the left side of the jaw, and cystic swellings were present (Figure I) extending almost to the ascending ramus on the right side of the lower jaw (Figures I and II).

He was prepared for operation, which was performed on March 28, 1957. A long transverse incision was made, extending from the left side of the neck beneath the jaw and chin around to the right side of the neck to a point about an inch or two behind the right angle of the lower jaw. The residual diseased portion of the jaw was excised, the muscles being carefully preserved and their ends being maintained in an identifiable condition. A steel prosthesis

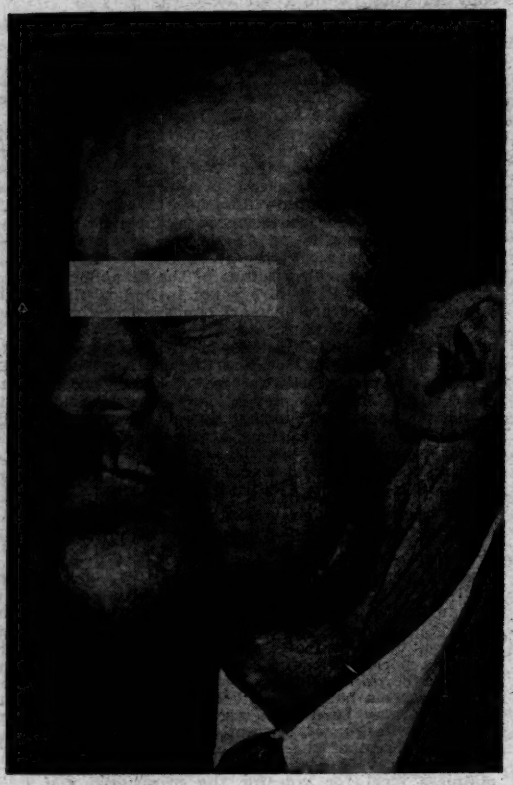

FIGURE I.
Mr. A. before operation, March, 1957.

manufactured by Oke Precision Products Limited was inserted, and after several fittings, during which the prosthesis had to be taken back to the factory to be altered, it was screwed to the remaining portion of the ascending ramus of the right side of the lower jaw (Figure III). The muscles were then stitched to a series of holes in the jaw, and finally the skin incision was closed over them. A tracheotomy was also performed, as it was thought that the patient's tongue might swell or his pharynx collapse, and that he might suffer from obstruction of respiration. In addition to this, a Kaslow gastric suction tube was introduced into his stomach, so that he could be fed regardless of whether he could swallow or not.

His condition after the operation, although it took over four and a half hours to perform, was satisfactory. He was given an antibiotic cover of penicillin and streptomycin. On April 1, his main complaint was of pain in the stomach due to his peptic ulcer. This was treated with "Amphogel" passed down the gastric tube, and was relieved. The tracheotomy tube was removed on April 4, when his condition was very satisfactory and that of the wound was excellent. By April 5 he was very well, taking semi-solid food and having no pain. By April 10 he was much improved and fit for discharge, and was sent home that day in a satisfactory condition, able to swallow his food and with complete control of his tongue and pharynx and surrounding structures (Figure IV).

He subsequently reported back for observation. The wounds had caused no trouble at all. Even the point of a screw inside the right side of the mouth, which had protruded a little further than would have perhaps been considered advisable under the mucosa, and which was rather prominent early in the post-operative stage, had now become covered with good solid mucosa and was not causing any anxiety. He had resumed his occupation several weeks after his discharge from hospital, and had full control of his face, jaw, pharyngeal and laryngeal muscles, etc. and had no pain or discomfort. The section of the specimen was sent to the Institute of Medical and Veterinary Science of South Australia, and was reported upon as follows by Dr. J. Orde Poynton:

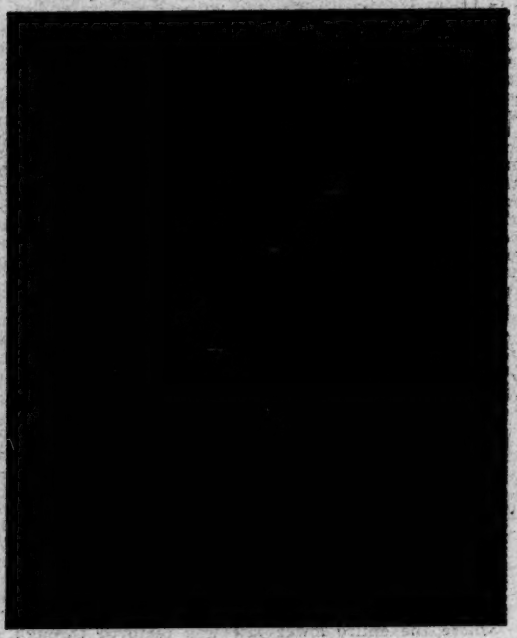

FIGURE II.
Mr. A.: Skiagram of mandible before operation.

Report. This is not a typical adamantinoma of the jaw. The growth is not forming the usual clumps of adamantinomatous epithelium separated by stellate reticulum. It is growing as a poorly differentiated adenocarcinoma—presumably a carcinoma of tooth germ epithelium—groups of syncytial cells are seen. However, the more typical cyst lining leaves no doubt as to the diagnosis.

Comment. Adamantinoma is the commonest of the dentigerous neoplasms. Whether these tumours really arise from ameloblasts is a matter of dispute. They usually occur between the ages of 30 and 50 and are four or five times more common in the lower than the upper jaw.

Histologically the appearances vary widely though the characteristic type includes islands of enamel pulp surrounded by what has been regarded as a layer of cylindrical ameloblasts. In other cases the tumour has the appearances of a cylindroma, while in this particular instance it is growing to resemble a rather poorly differentiated adenocarcinoma. The older authorities such as L'Espérance and Malassez classified adamantinomata by their histological appearances but this is not now considered justified. While some tumours are uniform throughout—ameloblastomatous, acanthomatous, plexiform, glandular or myxosarcomatous—others

show varied appearances in different areas. Adamantinomata characteristically belong to the group of tumours which, while seldom metastasising, are both relentless and destructive in their local growth and in practice are seldom cured because seldom removed.

The Substitution of Foreign Material for Human Tissues.

Since the sixteenth century, continuous efforts have been made to find substances which can be substituted for tissues lost by disease or accident and can be used to support tissues. Until the last few years it was found that almost all foreign materials ultimately reacted with the tissues and led to extrusion or other trouble. Through the development of almost completely inert materials, much new surgery has become possible—e.g., the permanent emplacement of pins, plates and screws in bone, and as in this case the replacement of

FIGURE III.
Mr. A.: the prosthesis in place after operation.

a bone, the loss of which without replacement would probably lead to a fatal end.

The exact composition of the steel used is not disclosed, but it has proved inert in the upper end of the femur as pins and blade plates in a large number of cases. It can be worked more easily than vitallium, so that its application is likely to be possible in places far removed from centres where the facilities for working vitallium exist.

It is thought also that should the prosthesis have to be removed later, there will be a more suitable bed for the implantation of a bone graft than would have been the case if bone had been implanted as a primary measure.

Treatment of Adamantinoma of the Jaw at the Royal Adelaide Hospital.

It was also thought of interest to review certain aspects of cases of tumour of the jaw at the Royal Adelaide Hospital over a five-year period, so a survey was made. The period covers the period from June, 1952, to June, 1956. A total of only 29 patients were admitted under the general diagnosis of tumours of the jaw, some details being as follows. There were 14 male and 15 female patients, and the tumours were typed as follows: adamantinoma, four cases; osteoclastoma, two cases; dentigenous cysts, five cases; fibrous epulis, two cases; sarcoma, two cases; squamous-cell carcinoma, five cases; dental cysts, nine cases. As the main interest centres upon the adamantinomas, case histories of those seen and the clinical records relating to those treated here are appended in précis form.

CASE I.—A female patient, aged 22 years, had an ameloblastoma of the upper jaw. The growth was in the roof of the mouth. She had had two previous operations and had had portion of the left upper jaw removed. No X-ray findings were recorded, and there was no available record of

FIGURE IV.
Mr. A. two weeks after operation, April, 1957.

a histopathological examination. The recurrence was treated by diathermy, and she was discharged from hospital three days later. There were no follow-up notes available, and the result can only be guessed at at this time. However, the next case is of interest.

CASE II.—The patient was a female, with the same name as the patient in the previous case; she was now said to be 29 years old. She was admitted to hospital with the diagnosis of an ameloblastoma of the upper jaw, with a history that three years previously she had had a swelling of the left upper jaw, probably an ameloblastoma. Partial excision had been performed, followed by radiotherapy, and she had subsequently been admitted to hospital with extension into the cranial cavity. No X-ray findings were available. A biopsy was performed, and the pathological report on the tissue was "probable ameloblastoma". She was referred to the radiotherapist, whose opinion was: "Some palliation may be obtained by radiotherapy." There is no further information about her fate.

CASE III.—A male patient, aged 59 years, complained of ulceration in the front portion of his left upper jaw. He had an incisor tooth removed without relief, so a biopsy was

then performed, and examination of the specimen revealed an adamantinoma. There is no record of any X-ray findings. He was subjected to excision of the left half of the upper jaw and apparently recovered from this, being discharged a fortnight later "to the care of private doctor", so no further information was available.

CASE IV.—A male patient, aged 32 years, was admitted to hospital complaining of a lump in the right side of the upper jaw present for two and a half months. Examination revealed a swollen area of the alveolus between the right upper incisors and the first premolar tooth. X-ray examination revealed extensive tumour formation in the upper jaw, and a biopsy specimen was reported on as showing an adamantinoma of the upper jaw. He was referred to the radiotherapists, whose opinion was as follows: "Radiosensitivity comparable to a rodent-ulcer of the skin and X-ray treatment should be tried before massive surgical treatment." Radiotherapy was tried without success, and he was subsequently readmitted to hospital and submitted to extensive upper jaw resection.

As a contrast to the progress of the adamantinoma, the following case of a probable composite odontome is described.

A married woman, aged 34 years, was admitted to hospital on August 11, 1955, complaining of an enlargement of the right side of the face of three months' duration. On examination of the patient, the right side of the lower jaw was expanded just to the right of the mental symphysis for about one and one-third inches. An X-ray examination showed the right side of the lower jaw to be expanded by an irregular dense mass separated from the cortex by a less dense area. On September 16 the mass was removed. It was ivory hard, and came out cleanly after the bone had been chiselled away from over it. Pathological examination of sections revealed islands of bone surrounded by cellular fibrous tissue. No giant cells were seen. It was an osteofibroma, not malignant. On October 21, a further operation was performed, and the expanded outer table of the lower jaw was excised. When the patient was last examined on May 28, 1956, she was quite well, and an X-ray film of the lower jaw showed no abnormality.

The records of cases of adamantinoma reviewed lead to the belief that tragedy often lies ahead for the patient. Treatment, to be effective, must be radical and energetic from the commencement. The attending surgeon must have an adequate comprehension of the habits of these rare tumours, and failure in treatment is often due to inadequate biopsy and ill-advised limited attacks by radiotherapy, diathermy or surgery. A study of the ordinary textbooks is thought quite useless as a full guide to the treatment of them. The complete answer has perhaps not yet been obtained. The X-ray sensitivity of the tumours is probably comparable to that of a rodent ulcer of the skin, but their involvement of bone must complicate prognosis. Unsuccessful radiotherapy must reduce the hope of successful surgery on account of the spoiling of the tissues, and may stimulate more aggressive growth of the tumour. In cases of limited extent the best result will probably be obtained by wide excision, and, when the lower jaw is involved, by immediate replacement of the excised part by bone; but the excision must be ruthlessly adequate.

Summary.[1]

A case of extensive adamantinoma of the lower jaw treated by wide excision and metal prosthesis replacement is described. Failure in the treatment of adamantinoma of the jaw is often to be attributed to: (i) an inadequate comprehension of the habits of these rare tumours, (ii) inadequate biopsy, (iii) limited or inadequate attacks by radiotherapy, diathermy or surgery.

Reference.

CONLEY, J. J. (1951), "The Use of Vitallium Prostheses and Implants in the Reconstruction of the Mandibular Arch", *Plast. reconstr. Surg.*, 8:150.

[1] After the reading of the paper, Dr. Paul W. Greeley, Professor of Surgery and Head of the Plastic Surgery Division, University of Illinois College of Medicine, Chicago, Illinois, said that he would never put a metal prosthesis in to replace a jaw, as later reconstruction was almost impossible, and in his opinion primary bone grafts were better.

Addendum.

At the time of sending this article to the Press, over two years after the steel prosthesis was implanted, Mr. A. was still in good health.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"A Guide to Orthopædics", by T. T. Stamm, M.B., B.S., F.R.C.S.; First Edition; 1958. Oxford: Blackwell Scientific Publications. 8¼" × 5¼", pp. 115, with 7 plates. Price: 12s. 6d. (English).

Intended for the non-specialist.

"Treatment of Lung Cavities and Endobronchial Tuberculosis: With Special Reference to Treatment in Malaya", by Beryl E. Barsby, M.D., M.R.C.P.; 1959. Edinburgh and London: E. & S. Livingstone Limited. 8½" × 5½", pp. 156, with 46 illustrations. Price: 20s. (Abroad).

". . . one facet of three years' work in an Asian country where pulmonary tuberculosis is widespread."

"Practical Obstetric Problems", by Ian Donald, M.B.E., M.D., B.S. (Lond.); B.A. (Cape Town); M.R.C.S. (Eng.), L.R.C.P. (Lond.); F.R.F.P.S. (Glas.); F.R.C.O.G.; Second Edition; 1959. London: Lloyd-Luke (Medical Books) Limited. 8½" × 5½", pp. 728, with many illustrations. Price: 55s. (English).

This book, first published in 1955, has been fully revised.

"Medical Education: Annotated Bibliography, 1946-1955", World Health Organization; 1958. Geneva: World Health Organization. 9½" × 6", pp. 392. Price: £1 15s., $6.75, Sw.Fr. 20.

Contains 2571 references culled from an exhaustive study of the world literature on medical education.

"Elements of Vital Statistics", by B. Benjamin, B.Sc., Ph.D., F.I.A., F.S.S.; 1959. London: George Allen & Unwin Limited. 9¼" × 6", pp. 352. Price: 56s. (English).

A completely new text resulting from an attempt to revise Newsholme's "Elements of Vital Statistics", now out of print.

"Doctor in the Asian Beyond: The Edge of Tomorrow", by Thomas A. Dooley; 1959. London: Victor Gollancz Limited. 8½" × 5½", pp. 233, with illustrations. Price: 22s. 6d. (Aust.).

The author tells his own story of his experiences in Laos.

"Miscellaneous Notes: The Gradual Emergence of a Fashionable Stereotyped-kind of Antigen Therapy", by F. Parkes Weber, M.D., F.R.C.P., F.S.A.; 1959. London: H. K. Lewis & Company, Limited. 7¼" × 4¾", pp. 16. Price 3s. (English).

A series of short contributions of a personal character on miscellaneous medical topics.

"Surgery of the Colon", by E. S. R. Hughes, M.D., M.S. (Melb.), F.R.C.S. (Eng.), F.R.A.C.S.; 1959. Edinburgh and London: E. & S. Livingstone, Limited. 9½" × 6¼", pp. 424, with 234 illustrations. Price: 63s. (English).

A sequel to the author's "Surgery of the Anus, Anal Canal and Rectum" published in 1957.

"The Annual of Czechoslovak Medical Literature, 1956", by Státní Lékarská Knihovna; 1958. Praha: Státní Zdravotnické Nakladatelství. 8" × 5¼", pp. 456. Price: not stated.

A general report on the Czechoslovak literary medical production in 1956.

"Brain, Memory, Learning: A Neurologist's View", by W. Ritchie Russell, C.B.E., M.D. (Edin.), D.Sc. (Oxon.), F.R.C.P. (Edin. & Lond.); 1959. Oxford: Clarendon Press. 8½" × 5½", pp. 152, with 12 illustrations. Price: 33s. 6d. (Abroad).

The author's emphasis is on physiological activity.

"Group Psychotherapy Theory and Practice", by J. W. Klapman, M.D.; Second Edition; 1959. New York and London: Grune and Stratton, Inc. 6" × 9", pp. 300. Price: $6.75.

The first edition appeared in 1946.

The Medical Journal of Australia

SATURDAY, JUNE 13, 1959.

EPIDEMIOLOGY AND CARDIOLOGY.

EPIDEMIOLOGY is a relatively modern word, although the word epidemic goes back to Hippocrates. Epidemic means simply "upon the people"; so that epidemiology is primarily the study of outbreaks of disease in human populations. Douglas Guthrie[1] regards Fracastorius as the first epidemiologist. In support of this he refers to *De Contagione*, which Fracastorius published in 1546, and in which he described the three methods of infection—infection by direct contact, infection by fomites and infection at a distance. Guthrie calls the description "wonderfully modern" and refers to the presumption by Fracastorius that there existed imperceptible particles or "seminaria, the seeds of disease which multiply rapidly and propagate through light". Fracastorius was long before his time, if we are to accept Guthrie's view that he was the founder of modern epidemiology; it was not indeed till the nineteenth century, when the nature of infectious disease gradually came to be understood, that epidemiology made any real progress. This was the time when interest was being aroused in public health generally, and Gavin Milroy, on whose benefaction the Milroy Lectures were founded in 1865, was then a young doctor. In his day he became a leading epidemiologist, viewing diseases, "not so much in detail, but rather in the aggregate; not as individual cases, but in groups; not in one place only, but in wide and varied areas".

Not unnaturally infectious diseases were the subject of most epidemiological studies until fairly recent times, but gradually the field of interest has widened. Thus a modern writer, Kenneth F. Maxcy,[2] defines epidemiology for present purposes as "that field of medical science which is concerned with the relationships of the various factors and conditions which determine the frequency and distributions of an infectious process, a disease, or a physiological state in a human community". He goes on to say that it seeks to advance rational conceptional schemes of causation of the various ills that afflict mankind. To the extent that this body of knowledge is advanced and valid, it becomes possible for appropriate community agencies to take effective measures directed toward prevention, control or eradication. This is a very broad view, but, as A. R. Southwood[3] has pointed out in the Milroy Lectures for 1959, which he delivered before the Royal College of Physicians of London on February 3 and 5, the definition adopted long ago by the Sydenham Society—"epidemiology treats of disease prevalent among people at a special time"—supports a wide view. Indeed, it is difficult to limit it, particularly when one realizes that it is used very broadly in a non-medical sense; Southwood quotes references to epidemic terror of an imaginary danger (Scott), an epidemic of despair (Burke), epidemics of opinion (Brodie), and the toleration of epidemic whoredom (Milton). To these might be added James Anthony Froude's statement that there are "epidemics of nobleness as well of epidemics of disease". With this broad conception there is very little in medicine to which the term epidemiology cannot be applied.

As the logical basis of a great deal of modern preventive medicine epidemiology thus becomes a significant aspect of modern medical practice, of which the prevention of illness is the high ideal. It is not surprising therefore that Dr. Southwood, as both a clinician and the Director-General of Health in South Australia, took the subject of preventive cardiology as the basis of his Milroy Lectures. He points out that, according to available statistics, more than one-half of the deaths to be certified by doctors in Australia are due to diseases affecting the heart and blood vessels. There has been a rapid and continuing decline in deaths from infectious illnesses, including tuberculosis, but it should be noted that there is an increase in deaths from accident and violence, which account for over 70% of all deaths of young men between the ages of 15 and 24 years. In England and Wales and the countries of North America the trends in death statistics are similar. Southwood states that more people are living into old age; whereas in 1911 only 6·41% of the people living in Australia were over 60 years of age, in 1954 the percentage was 12·51. Amongst elderly people the main causes of death are diseases of the heart, cancer and accidents, and all these are likely to increase further. He then goes on to refer to various forms of heart disease and the changing situation with regard to them in modern medicine. The congenital forms are becoming better understood and increasingly amenable to treatment. The major groups, however, are those due to rheumatic infection, hypertension and atherosclerosis, and about these there is a great deal that we still need to know. Rheumatic heart disease is decreasing in frequency, but the other two groups are increasing. One form that has disappeared is the so-called athlete's heart, as the term is just no longer accepted as a diagnostic label. The use of penicillin and the sulphonamides has brought a sharp drop in another group, that due directly to infection. Hypertension is still a scourge, and is if anything increasing in its significance. Some progress has been made in its management, but the ultimate causation and so the institution of satisfactory preventive measures still largely elude the investigator. The group of cardio-vascular conditions under the rather unsatisfactory heading of atherosclerosis provides a major modern problem. Responsible for a significant proportion of the deaths from cardio-vascular disease, they have been the subject of intensive investigation for some years now, but no one could pretend that anything like finality has been reached in this investigation. "Many factors . . . are under suspicion, but knowledge of the real cause of atherosclerosis still eludes us. It may come from the combined

[1] "A History of Medicine", 1945, Nelson, London: 165.
[2] "Rosenau's Preventive Medicine and Hygiene", Seventh Edition, 1951, Appleton-Century-Crofts, New York: 1289.
[3] *Lancet*, 1959, 1: 377 (February 21) and 435 (February 28).

operations of several factors. It certainly is no clear-cut matter . . . "

It is interesting to note that Southwood in his summing-up remarks that though "the use of modern methods of investigation, in institutions replete with elaborate apparatus operated by highly trained technicians, is producing a wealth of data, cardiological research is not merely a matter for laboratories, nor is the specialist in his consulting-room, even with the array of apparatus, in the best position to supply some types of information". Large epidemiological surveys, continued over many years, have a part to play, as have the observations of individual doctors, including general practitioners. The interest in clinical research being shown by The Australian College of General Practitioners tends particularly to follow the lines of epidemiological investigations and is a most desirable development. It may well be that a real contribution to the understanding of cardiovascular disease is to be found here. For the moment there is still not a great deal of specific character that can be passed on to the man in the street who inquires how he may avoid cardio-vascular disease, especially atherosclerotic disease, which now occupies a considerable place in the thinking of both doctors and laymen. Southwood sets out a series of ten basic ideas on the subject, but, as he readily admits, their ultimate implication for practical living is little more than the *regimen sanitatis* of the Salerno school of the Middle Ages: " . . . gainst all surfets vertues schoole hath taught to make the gift of temperance a shield."

Current Comment.

THE USE OF ISOTOPICALLY LABELLED FAT IN DIAGNOSIS.

DISORDERED lipid metabolism may be associated with decreased intestinal absorption or with derangement in utilization, transport or storage of fat. Several methods have been used for the study of these conditions, but all suffer from some defects. The use of radioactive fat or fatty acid offers a new tool for study. The material may be obtained in the form of the triglyceride, triolein, or as free oleic acid. Activity is imparted by the addition of I^{131} to the double bond in the oleic acid molecule. It has been demonstrated that these substances react in the body like normal fatty acids. A number of investigators have used radioactive fats in the study of fat absorption and other aspects of fat metabolism. D. Berkowitz, D. Sklaroff, A. Woldow, A. G. Jacobs and W. Likoff[1] have defined conditions for investigating various lipid disturbances by the use of radioactive fat. A fat meal is given containing 25 μc. of I^{131} triolein or oleic acid in a total volume equivalent to 1 ml. per kg. of body weight of peanut oil. Thereafter venous blood samples are withdrawn at intervals until a maximum radioactivity level has been reached, and then again after 24 hours. The radioactivity of each sample, as well as of the 24-hour urine and stool collections, is determined and expressed as a percentage of that of the initially ingested fat. The radioactive iodine circulates in the blood in two forms, an organic fraction and an inorganic fraction resulting from the utilization of the fatty acid. The radioactivity findings are recorded on a graph. The points to be noted are: the time of maximal blood radioactivity, the magnitude of this value, the 24-hour reactivity level and the ratio of organic fraction to whole blood radioactivity level.

In normal persons the peak of whole blood radioactivity usually occurs at almost the sixth hour and is about 11·7%. The 24-hour activity is about 2%. The organic fraction represents less than 50% of the total. The greatest information seems to be obtained by comparing the curve for radioactive triolein with that for radioactive oleic acid. In steatorrhœa due to pancreatitis the oleic acid curve is about normal, while the triolein curve is very flat. In jaundice a normal triolein curve rules out any major obstructive process, whereas the presence of a flat triolein curve and a normal oleic curve is indicative of extrahepatic block. In a variety of diseases varying degrees of impaired fat absorption may be present. The radioactive fat technique affords a simple way to assay this. In metabolic studies the method is also of use. In essential hypercholesterolæmia, coronary atherosclerosis and perhaps obesity the radioactive fat tolerance curves show unusually high peak blood levels and elevated 24-hour levels. Further details can be learned from study of the urine and fæcal radioactivity figures and from a consideration of the ratio of organic to inorganic radioactivity of the blood. Provided apparatus is available for estimation of radioactivity, the technique seems to be a simple one giving very useful diagnostic information.

[1] *Ann. intern. Med.*, 1959, 50: 247 (February).

HARE-LIP AND CLEFT PALATE.

CLEFT LIP and palate are relatively common congenital abnormalities, said to occur either singly or in combination in about one in 600 live births. Michael Oldfield[1] of Leeds has reported on 1041 personal cases, which he analyses from the point of view of possible causation. He believes that there is usually a recessive gene involved, but that some other factor may be required in the form of "environmental provocation" to produce the defect. This environmental factor is very variable, and animal experimentation gives the clue to certain precipitating causes ranging from malnutrition through vitamin deficiency or excess, drug therapy, rubella, toxæmias of pregnancy and anoxia in the fœtus to radiation or to blood group sensitization. None of these factors appear to have been of outstanding importance in the cases in his series.

In discussing treatment Oldfield describes his own methods only, without any suggestion that other methods are advised by equally eminent authorities. He prefers Le Mesurier's method for the lip repair in the management of the common unilateral complete hare-lip. In this method a rectangular flap is created on the outer side of the cleft, and this is rotated into a niche in the thin inner segment. By this method a good nostril as well as lip can be made. Operation is undertaken when the baby weighs 12 lb. or more. For an incomplete cleft Oldfield prefers a straight line approximation. For bilateral cleft lip, with protrusion of the premaxilla, which is the real bugbear in cleft lip surgery, Oldfield prefers a one-stage repair in which none of the vermilion of the central prolabium is used in the vermilion border of the completed lip—in other words, the Denis Browne type of repair. In this view many plastic surgeons will violently disagree with him, for by this method it is difficult to avoid in later years the unpleasant tall lip which is tight from side to side, a defect which becomes more and more apparent with the passage of time. There is much to be said for those who deliberately preserve the prolabium in the vermilion border, although it gives a less pleasing early appearance. Oldfield also advocates for protruding premaxilla removal of a triangle of bone from the junction of premaxilla and prolabium. Many surgeons believe, however, that resection in the central portion of bone, if done at all, should be well back in the vomer, so as not to interfere with the ossification centre near the prolabium and so as to leave the blood supply to the prolabium intact.

[1] *Brit. J. Surg.*, 1959, 46: 311 (January).

Similarly in discussing cleft palate repair Oldfield's method is similar to that of Wardell and Kilner, in which rotation flaps are used, rather than the sliding flaps obtained by the Langenbeck type of operation. No reasons are advanced by Oldfield for his preference. He aims to repair the defect before the child learns to speak and maintains that the dental arches are of secondary importance. No mention is made of the school of surgeons who believe that the palate repair should be delayed to an older age group in the hope of achieving more normal growth of the bony framework of the face and dental occlusion. However, most surgeons would agree with Oldfield that the length of the soft palate is of less importance than its muscularity and mobility, with a strongly arching levator sling. He does not believe in preliminary pharyngoplasty.

The opinions of an author of Oldfield's standing must be respected, but it is a pity that he does not indicate that there are many good surgeons who aim to avoid some of the technical points which he aims to achieve. In discussing results of treatment he claims the development of excellent speech in 303 of 397 patients who were reviewed for speech results, with a further 71 whose speech was imperfect but easily understandable. However, such figures mean little when no statement is made as to how many subjects of cleft palate repair were not so reviewed. It seems fair to suggest that no answer will be found to the problem of which are the best operations for achieving pleasing appearance and perfect speech until careful follow-up results at the age of 14 to 16 years are produced by cleft palate "teams" which include speech therapists, orthodontists and other interested workers. Such teams are working actively in various overseas centres at present and may in due course cast light into the darker places of the cleft lip and palate problems which are still unsolved.

THE CLASSIFICATION OF ATHEROSCLEROSIS.

THE terms and criteria used in the classification of atherosclerotic lesions vary considerably from country to country, and as a result the pathological comparison of these lesions is extremely difficult. A report[1] has now been issued of a meeting of pathologists and other experts in this field convened by WHO in October, 1957, to recommend methods of examining, assessing and reporting on necropsies with particular reference to coronary artery and myocardial lesions. The report sets out methods of grading and classifying atherosclerotic lesions. It was the opinion of those who met that such a classification should be based on objective pathological findings rather than on specific schemes and pathogenesis, and that atherosclerosis should be considered to be the same process in different arteries. In considering the difficulties involved in standardizing procedures, so that the resulting observations may be compared with a reasonable degree of accuracy, the report calls attention to the need for relatively simple methods for the quantitation of lesions and stresses the desirability of using grossly visible changes. Recommendations are made for the macroscopic grading of atherosclerotic lesions in the aorta and in coronary, cerebral, pulmonary, renal and mesenteric arteries. Specimen charts and diagrams for recording the data are shown in an annex to the report. It is pointed out that the histological grading of single atherosclerotic plaques may be of value in characterizing special cases, and the report lists histological changes which may be found in the aorta and coronary arteries. It recommends that further research be carried out to determine the value of certain techniques which may also prove valuable in the classification of atherosclerotic lesions. The report outlines an international programme for the pathological study of gross and histological lesions of atherosclerosis and for the development of associated epidemiological investigations. As the report states, a beginning has been made, but the continued participation of pathologists on an international level is essential for the successful prosecution and completion of this important project.

[1] "Classification of Atherosclerotic Lesions: Report of a Study Group", World Health Organization Technical Report Series, No. 143; 1958. Geneva: World Health Organization. 9½" × 6¼", pp. 20. Price: 1s. 9d.

A NEW COMMONWEALTH DIVISION OF PUBLIC HEALTH.

As from September, 1958, a Division of Public Health has been functioning at the Central Office of the Commonwealth Department of Health in Canberra. Details of this important development are given in the Department's journal *Health*.[1]

The new Division coordinates under a Director a wide variety of activities of the Commonwealth in the field of public health, and in particular, those activities of particular concern to the National Health and Medical Research Council.

Subject to any direction of the Director-General of Health, the functions of the Division and its Director are as follows:

1. To study the incidence of disease and the causes of mortality and morbidity in Australia.

2. To study the factors which are preventible, and formulate for the consideration of the Director-General practical measures for dealing with them.

3. To act as a coordinating link with the Public Health Committee and such other committees of the National Health and Medical Research Council as may be determined by the Director-General.

4. To prepare and bring to the notice of the Chairman of the National Health and Medical Research Council such projects as may be within the compass of the Division. In particular the functions under this heading are: (*a*) to maintain and develop a liaison with The College of General Practitioners in its study of human disease and its control and prevention; (*b*) to keep the Director-General informed of any development in the study of general practice which the Department is sponsoring; (*c*) to work, through the Public Health Committee, with State and local health authorities and agencies administering laws concerned with the control and prevention of disease, including those relating to the purity of food and drugs and the control of poisons, the object being to secure improvement where necessary and reasonable interstate uniformity where desirable; (*d*) to act as consultant and technical adviser to the Division of Veterinary Hygiene and Plant Quarantine of the Department in its relation to the State Departments of Agriculture and other agencies concerned in the use of hormones, antibiotics, or poisons or other substances under circumstances likely to affect the health of man, or impair the value of a drug as a therapeutic agency in man; (*e*) to act as consultant and technical adviser to the Division of Veterinary Hygiene in its study of the zoonoses and their control, and to devise and apply measures to prevent human involvement; (*f*) to study the activities of the agencies concerned in medical research relating to preventive medicine, including those established within the Commonwealth Department of Health, and make suggestions to the Director-General for any projects; (*g*) to act as consultant and technical adviser on tropical medicine to the Director-General and keep in touch with the departmental administration in the Central Office with regard to the measures to be adopted for tropical hygiene; (*h*) to coordinate with the Commonwealth Serum Laboratories and the Public Health Committee any measures practicable to secure the maximum level of immunization and to advise the National Health and Medical Research Council on any recommended procedure.

5. Such other functions as from time to time may be allotted by the Director-General of Health.

The Director of the new Division is Dr. C. E. Cook, who is well known and respected in the public health field and in medical circles generally.

[1] *Health*, 1958, 8:116 (December).

Abstracts from Medical Literature.

ORTHOPÆDIC SURGERY.

Compression Arthrodesis of the Knee.

J. CHARNLEY AND H. G. LOWE (*J. Bone Jt Surg.*, November, 1958) report on the end results in 171 cases in which their operation of compression arthrodesis of the knee was performed between 1946 and 1956; the operations were performed by several different surgeons. Two cases of Charcot's knee were excluded because they were considered to present a different problem. In the remainder of the series there were only two failures. In most cases the patients were free of plaster and walking on the leg in nine weeks. Observation was made as to whether the technique indicated by Charnley, stressing the importance of 100 pounds' pressure, was followed, and, if not, whether this had any bearing on the end result. The techniques varied in some instances, but essentially the compression apparatus was kept in place for four to six weeks. It was then removed and a cylinder of plaster applied. The limbs were sometimes put in a Thomas splint, which was kept on for one month, though occasionally its application was continued for a further month if there were no signs of clinical union. After removal of the compression, firm clinical union was shown by the absence of springing when a passive strain was applied to the newly united area. In making their final assessment the authors consider that the method promotes union by other means than simply providing a more efficient system of splinting.

The Management of Pathological Fractures.

R. A. BREMNER AND A. M. JELLIFFE (*J. Bone Jt Surg.*, November, 1958) discuss the management of pathological fractures of long bones as a result of malignant disease, in the light of 36 consecutive cases at the Middlesex Hospital since 1954. These patients were treated by internal fixation of the fractures and radiotherapy. In recent cases, this technique has been extended to the use of internal fixation as a prophylactic measure in some cases of metastatic deposits in long bones. The authors consider that the idea that pathological fractures will heal when treated by simple external splinting is a misleading half-truth. Union of such fractures is often slow, and non-union is common when the cancer is highly malignant. For metastases in the region of the hip joint, the McKee nail and plate were used. When the site was in the femoral shaft, Küntscher intermedullary fixation was used. In the upper limb pathological fractures of the humerus were treated by Rush pins. The blind technique was attempted, and was found to be more difficult than usually expected, so if necessary the fracture site was exposed. A biopsy specimen was taken when this was done. The aim of the operation was to fix the fracture sufficiently well to avoid external splinting. Radiotherapy was initiated immediately after the fixation. Hormonal treatment was also given if indicated, and occasionally adrenalectomy or pituitary ablation was performed. The patient was mobilized as soon as possible. When the upper limb was involved, he was encouraged to use it, and if the lower limb was involved, when at all possible the patient was got up, using crutches to avoid weight-bearing. In assessing the results of this procedure it was found that there were no operative deaths, and no cases of sepsis or fungation. In all cases the pain was very much relieved. Twenty-seven of the patients survived for more than three months, and union did appear to occur. When fixation was used prophylactically, immediate full weight-bearing after operation was the usual procedure. In a discussion the authors consider a suggestion that intramedullary fixation disseminates the tumour. They conclude that this danger is no greater than might be expected after pathological fracture.

Intraarticular Injections in Osteoarthritis of the Knee.

J. A. MILLER *et alii* (*J. Bone Jt Surg.*, November, 1958) note that there are contradictory views on the efficacy of various intraarticular injections used in the management of osteoarthritis of the knee. They state that a variety of substances have been used, beginning with lactic acid with procaine; other substances include acid potassium phosphate, sodium bicarbonate, procaine alone and, more recently, the cortisone group of drugs. The authors undertook an investigation designed to study the treatment in cases of primary osteoarthritis, conditions in which there was some other underlying cause being excluded. A series of 181 cases was studied. Five types of injection were used. These were: lactic acid solution, "Novocain" solution, hydrocortisone solution, physiological normal saline solution and a mock injection. This mock injection was given with a special syringe which inserted nothing into the joint. The results were assessed both from the point of view of the patient and on clinical grounds. From both approaches, no significant difference in the final result could be demonstrated between any of the different injections used, including the mock injection.

Foot Forms in Non-Shoe and Shoe-Wearing Chinese.

LAM SIN-FOOK AND A. R. HODGSON (*J. Bone Jt Surg.*, October, 1958) have made a comparison of the foot forms of Chinese who wear shoes and those who do not. To represent the non-shoe-wearing portion of the population they selected fishermen. The shoe-wearing portion was represented by patients admitted to surgical wards of the Queen Mary Hospital, Hong Kong. Unshod feet showed some very definite findings. In general, these feet were much broader in the fore foot and more mobile. There was a cornified layer one-half to one centimetre thick, which was fissured transversely. The nails were thickened and broken. The skin on the dorsum of the foot was wrinkled. The arches were good as a rule. Those who had flat feet did not complain of them. There was a tendency for the feet to swell when they were kept wet for long periods, as often happened. Metatarsus valgus and metatarsus primus varus were common conditions, with separation between the great toe and the second toe. In general, there was great flexibility of the great toe and prehensile strength, indicating the function of the foot which could occur when it was not bound by shoes. The Chinese people wearing shoes wore either wooden clogs or tight-fitting canvas shoes. Some of the poorer classes wore rubber shoes with very thick soles. In these people, deformities and decreased mobility were prevalent. The deformities were characteristic of those usually found in shoe-wearing people.

Tendon Transfers to Restore Hand Function in Tetraplegics.

P. R. LIPSCOMB *et alii* (*J. Bone Jt Surg.*, October, 1958) discuss the methods of improving the functions of the hand in tetraplegic patients. They list their results and describe in detail the technique of the operations used. When the paralysis extends above the level of the sixth cervical segment, then tenodesis of the flexor tendons, to give closure of the hand during dorsal flexion, is the only procedure available. When the lesion is between the sixth and seventh cervical segments all the intrinsic muscles of the hand are paralysed. However, the extensor carpi radialis, longus and brevis, brachio-radialis, flexor carpi radialis and pronator teres are available for transfer. The results are successful even if the power is weak. When the lesion is between the seventh cervical and first thoracic segments there are many active muscles available for transfer. The after-care is described, and the results obtained are stated to be useful.

Aseptic Necrosis of Bone in Caisson Disease.

J. D. THOMSON AND A. B. YOUNG (*Brit. J. industr. Med.*, October, 1958) discuss aseptic necrosis of bone in caisson disease and describe the case of a patient who suffered aseptic necrosis of an area involving the inferior aspect of the head and upper part of the neck of the right femur. They state that such lesions are not common, and that there is no agreement on the precise pathogenesis of avascular necrosis in caisson disease, as doubt has been cast on the role of nitrogen emboli in producing this lesion.

HYGIENE.

Ornithosis Transmitted from Turkeys.

R. GRABER AND B. POMEROY (*Amer. J. publ. Hlth*, November, 1958) report the results of an epidemiological study of an outbreak of ornithosis in humans and turkeys. A large reservoir of ornithosis infection was found in domestic turkeys in Wisconsin and Minnesota. Later an outbreak of the same disease occurred among workers in a turkey-processing plant in the same area. The dates of onset in the cases involved occurred over a protracted period, indicating that

workers at the plant were subjected to multiple exposure. It appeared that the disease was transmitted to plant workers from turkeys harbouring the infection at the time they were killed. The incidence of infections suggested that transmission of virus occurred in dust particles and other aerosols produced by spray in the killing department, where most of the infected workers were employed. The human infections appeared to have been caused by virus strains identical in serotype with those isolated from the turkeys.

Toxic Solvents.

E. BROWNING (*Brit. J. industr. Med.*, January, 1959) reviews some of the recent work on the toxicology of industrial solvents. Advances have been made (i) in scientific methods of examining the physiological response, metabolic processes and detoxication mechanisms of human beings and animals subjected to the toxic effects of certain solvents; (ii) in the detection and identification of the presence of solvents in mixtures; (iii) in determining the chemical relationships of members of different groups; and (iv) in the measurement of concentrations of solvents in the air of workrooms. Some of the above advances are described in more detail, with reference to the knowledge so acquired about some of the older and some of the more recently developed solvents. Benzene, tertiary butyl toluene, trichloroethylene, perchloroethylene, carbon tetrachloride, trichloroethane, isophorone, di-isobutyl ketone, ethylene glycol, propylene glycol, methyl cellosolve, butyl cellosolve, propylene glycol methyl ethers, tetrahydrofuran, cyclohexylamine, ethylene diamine and carbon disulphide are all then discussed in more detail. The author concludes by saying that it is now possible to determine the probable nature and site of the toxic action of substances before human beings are exposed to them; more accurate methods of estimating the concentrations of toxic substances in the environment are now possible; and levels of maximum allowable concentrations have been determined for most toxic substances. As a result it is becoming possible to ensure that the hazards associated with the use of toxic substances are minimized to the fullest extent.

Radiation Hazards.

C. POWELL (*Amer. J. publ. Hlth*, January, 1959) states that not only are the number, variety, location, nature and use of radiation sources increasing dramatically, but newer scientific knowledge indicates that low-level radiation exposures previously thought safe may not be without risk. He refers briefly to acute and delayed effects produced by ionizing radiation and, in particular, the effect on genes. As no evidence has been found to the contrary, he considers that it should be assumed that there is no "threshold" amount of ionizing radiation to which a person may be exposed without ill effect. Investigations have indicated that ionizing radiation produced for diagnosis and treatment of disease forms a large part of the total amount of ionizing radiation to which large numbers of the world's population are exposed. It is approximately equal in amount to that received from natural sources, and much greater than that received from other man-made sources. The benefit received from any exposure to ionizing radiation should therefore be weighed against the harm that may result and every means taken to obtain the desired result with the minimum amount of exposure. The author considers that health agencies have a responsibility to evaluate sources of radiation exposure and their health effects, and to take leadership in those activities needed to assure that the health of the public is not adversely affected out of proportion to the benefits which can be derived from newer and increased use of ionizing radiation sources. Potential hazards, possible health agency activities, and the need for perspective in dealing with this increasing problem are emphasized.

Drivers in Automobile Accidents.

G. NEUMAN, J. HOWELL AND W. NEWMAN (*Amer. J. publ. Hlth*, November, 1958) undertook a pilot study of individuals who had had automobile accidents. A variety of psychological tests which might be relevant to the problem were used to determine whether a practical way could be found to indicate an accident-prone driver. The results indicate that those who had had no accidents were more persistent, self-reliant, independent, attentive and observant. They were more good-natured, ready to cooperate, and attentive to people. They would be more generous in personal relationships, less afraid of criticism. Those who had had accidents on the other hand tended to be more stiff, cool, aloof, more inhibited with unexpressed feelings of inferiority, and liked things rather than people. They tended to be more rigid in their ways of doing things and in their personal standards, and more self-centred and less concerned with the needs and wants of others. The authors then discuss some of the difficulties associated with such a study, but conclude that further intensive clinical studies of different groups of the population in relation to their accident experience would be worth while.

Speed in Injury-Producing Accidents.

J. MOORE (*Amer. J. publ. Hlth*, November, 1958) reports the results of a study of the reported impact and travelling speeds of 3203 cars in injury-producing accidents and the correlation of these factors with injury data on the 7154 occupants of these cars. Approximately 74% of the cars involved in injury-producing accidents were travelling at speeds under 60 m.p.h. and about 88% involved impact speeds under 60 m.p.h. In injury-producing accidents there was a statistically significant association between increases in both travelling speed and impact speed and the frequency of dangerous or fatal injury. Complete and absolutely controlled top speed limits would afford relatively limited reduction in the expectancy of dangerous or fatal injuries in injury-producing accidents. Many factors other than speed operated to produce injury in automobile accidents such as ejection, seat area occupied, and site of crash impact. In the bulk of injury-producing accidents, dangerous or fatal injury in low speed ranges—except where ejection occurred—appeared to be very largely a function of the shape and form of interior car components. Speed regulation without simultaneous control of car design imposes a limitation on the extent to which dangerous or fatal injuries in injury-producing automobile accidents can be reduced.

Enteric Infections among Alaskan Eskimos.

H. FOURNELLE, I. WALLACE AND V. RADER (*Amer. J. publ. Hlth*, November, 1958) surveyed enteric infections in an Eskimo population of approximately 2400 in south-western Alaska. Fæcal specimens from 1680 human beings and 289 dogs were examined. Diarrhœa at the time of the survey was due primarily to two types of *Shigella flexneri*, 2a and 3. A history of diarrhœa was given by 4% of the people interviewed, with the greatest reported prevalence occurring during July and August. Those most extensively affected were children in the 0 to 9 years age group, who accounted for 67% of the cases of diarrhœa and 72% of the bacterial pathogens isolated. Except for three isolations of *Salmonella typhosa*, no other salmonellæ were found. Two pathogenic types of *Escherichia coli* were isolated from four young children (055 : B5 and 0111 : B4). Only one bacterial pathogen was isolated from 278 fæcal specimens from dogs. Of the human parasitic infections, *Entamœba coli* and *Diphyllobothrium* sp. were most numerous. Prevalence rates for *E. histolytica* and *Diphyllobothrium* sp. were 1·7% and 10·6% respectively. In dogs, the most numerous parasites were *Diphyllobothrium* sp. (15·6%) and hookworm (56·7%).

Mortality Due to Coronary Disease Analysed by Broad Occupational Groups.

J. MORTENSEN, T. STEVENSON AND L. WHITNEY (*A.M.A. Arch. industr. Hlth*, January, 1959) carried out a mortality study covering a period of five years based on male employees of the Bell Telephone Companies in the United States of America. Active employees from 40 to 60 years of age were used for making comparisons between occupational groups. Management groups included officials, supervisors, staff and foremen. Non-management groups included craftsmen and labourers, and clerks. The lowest death rate was for the group of officials, the highest among the group of clerks. The authors consider that the high rate in the clerical group may be caused by the transfer of physically impaired craftsmen into the clerical group. In summarizing the results of the study the authors state that it is clear that in the Bell Telephone System there is no material difference in mortality from coronary disease between the top management group and the craftsmen and labourers group, but there is a marked difference between top management and middle management which is not explainable from data at present available. The popular notion that high executive positions are associated with high mortality from coronary disease is probably due to the greater publicity connected with such deaths rather than to statistical facts.

Special Article.

NOMENCLATURE OF BLOOD-CLOTTING FACTORS.

THE following report on the work of the International Committee for the Standardization of the Nomenclature of Blood-Clotting Factors has been supplied by Dr. P. Fantl. The members of the Committee are as follows:

T. Abe, Tokyo, Japan; B. Alexander, Boston, Massachusetts, U.S.A.; Tage Astrup, Copenhagen, Denmark; Kenneth Brinkhous, North Carolina, U.S.A.; E. Deutsch, Vienna, Austria; P. Fantl, Melbourne, Australia; Hartert, Heidelberg, Germany; R. B. Hunter, Dundee, Scotland (Vice-Chairman); L. B. Jaques, Saskatchewan, Saskatoon, Canada; H. Jensen, Fort Knox, Kentucky, U.S.A.; E. Jorpes, Stockholm, Sweden; F. Koller, Zurich, Switzerland; K. Lenggenhager, Bern, Switzerland; R. G. Macfarlane, Oxford, England; Willy Merz, Lausanne, Switzerland; Pietro de Nicola, Pavia, Italy; P. A. Owren, Oslo, Norway; Alfredo Pavlovski, Buenos Aires, Argentina; Armand Quick, Milwaukee, Wisconsin, U.S.A.; Laszlo Roka, Frankfurt am Main Sud, Germany; Walter Seegers, Detroit, Michigan, U.S.A.; Pierre Soulier, Paris, France; Marc Verstraete, Louvain, Belgium (Secretary); Irving S. Wright, New York, U.S.A. (Chairman).

Report.

In the past 10 years, in editorials and reviews by writers whose work is not directly connected with blood clotting, there has been noticeable a certain complaint which is levelled against coagulationists. The critics feel that blood clots with greater difficulty now than it used to do 10 years ago, and pose the question why the process of blood coagulation should be so extraordinarily complex. However, to consider the complexity as extraordinary is not justified. All biological processes in which highly active compounds are involved must by necessity be complex, because if it were otherwise, the particular process would go unrestricted without being initiated, activated or inhibited. If such processes were uncontrolled, it is easy to see that in the special case of clotting, as soon as the precursors of the clotting factors entered the blood-stream, clotting would occur with disastrous consequences. The criticism has also been made that several of the newer clotting factors of activating or inhibiting nature have been produced in laboratory experiments and are artefacts. This is a very unfair criticism, because very often it has subsequently been shown that a bleeding tendency was connected with a deficiency of a previously discovered factor. The only criticism which justly can be applied to coagulationists is that those who introduced a new factor should have been more careful in giving it a name. For certain factors 14 different names have been suggested, and it is difficult to see how this nomenclature problem can be solved.

In order to make the terminology more intelligible for clinicians and interested students, an International Committee for the Standardization of the Nomenclature of Blood Clotting Factors was established. The Committee's work began at the first International Congress on Thrombosis and Embolism held in Basel in 1954, when the multiple names for identical substances emphasized that the problem of international communication was a serious one in this field.

Twenty-two members from fifteen different countries were initially appointed. The list included the leading workers in the field, and most of the factors recently recognized had been discovered by these gentlemen. The first meeting brought into the open the fact that they had to a considerable extent created the problem, and they recognized that they had a moral and scientific responsibility to unravel it. It became clear that, though they had a paternal pride in the names of their choice, without cooperation and compromise, no progress could possibly be made. The efforts made by the members of the Committee to yield their own strong positions for the common good have been noteworthy.

One of the first decisions made by the Committee was that whatever system of nomenclature was proposed, names should be avoided which implied an action by any factor. The reason for this had become clear when factors which previously had been given names implying function had later proved not to have that function. It was agreed that symbols should be used to designate blood-coagulation factors until ultimately they were defined and identified in physical and chemical terms. However, certain essential physical and chemical data would have to be presented in support of the identity of any factor before the Committee would give it an international symbol.

With further study and negotiation over a three-year period, it became evident that only a numerical system fully met these qualifications, and since some factors had already received Roman numerals in addition to their names, it seemed logical to consider whether Roman numerals would be suitable as the international symbolic code, the author being allowed freedom to use whichever synonym he wished. Thus, one would write Factor V (pro-accelerin) or Factor V (labile factor), etc. The Roman numeral would be intelligible in most languages, including oriental languages. Four factors are known by their names, and for them Roman numerals are perhaps less necessary: they are: Factor I (fibrinogen), Factor II (prothrombin), Factor III (tissue thromboplastin), Factor IV (calcium). It seems likely that the names given in parentheses will continue in common usage, and in fact very few other names have been used for these factors.

One of the great problems facing the Committee was to decide when sufficient evidence was available to justify the assigning of a number to any factor or activity. The following agreement was reached:

1. The minimal requirements for characterization of a clotting factor in tissues, whole blood, plasma, serum or platelets shall be valid data on the reproducible effect on storage, adsorbability, inactivation by heating, effect of pH. Additional chemical data are considered highly desirable.
2. A clinically identifiable state associated with an abnormality in the clotting mechanism shall be regarded as supporting the evidence for the lack or excess of a factor.
3. Methods of assay and physiological properties shall be listed. An appropriate selection of these methods will be considered as minimal for presentation of a factor before the Criterion Committee. In the case of previously undescribed factors the procedures used for identification shall be clearly described by the author for study and possible acceptance by the Committee.

The Committee proposes to publish in detail elsewhere the criteria on which they have based their recommendation that four further blood coagulation factors should be recognized and assigned international symbols—namely, Factor V, Factor VII, Factor VIII and Factor IX. These factors have specific functions in the blood-clotting system and cannot be replaced by other compounds. Deficiency may result in haemorrhages. Deficiency may be congenital or acquired, and the deficiency may vary from complete absence of the particular factor to a mild degree of deficiency. Multiple deficiency may also occur.

The following are brief summaries of data concerning these four factors.

Factor V.

The synonyms of Factor V are: Factor V (Owren), pro-accelerin (Owren), thrombogene (Nolf), labile factor (Quick), prothrombin accelerator (Fantl and Nance), plasma ac-globulin (Ware and Seegers), proprothrombinase (Owren), prothrombokinase (Milstone), PPCF (plasma prothrombin-conversion factor) (Stefanini), component A of prothrombin (Quick), co-factor of thromboplastin (Honorato).

Deficiency of Factor V is indicated in plasma as a prolongation of the one-stage prothrombin time. Factor V takes part in the formation of blood thromboplastin, and in the conversion of prothrombin to thrombin in presence of tissue thromboplastin, Factor VII, Prower-Stuart Factor and Ca^{++}.

Factor VII.

The synonyms of Factor VII are: Factor VII (Koller), proconvertin (Owren), SPCA (serum prothrombin conversion accelerator) (deVries, Alexander), stable factor (Stefanini), co-factor V (Owren), serozym (Bordet), kappa factor (Sorbye and Dam), prothrombinogen ? (Quick), co-thromboplastin (Mann and Hurn), serum accelerator (Jacox), prothrombin conversion factor (Owren), prothrombin converting factor (Jacox).

Factor VII deficiency is indicated in plasma as a prolongation of the one-stage prothrombin time. Factor VII does not take part in the formation of blood thromboplastin. Factor VII takes part in the conversion of prothrombin to thrombin. Excess of Factor VII in blood has been observed in certain states associated with a high incidence of thromboembolism— e.g., during late pregnancy.

Factor VIII.

The synonyms of Factor VIII are: Factor VIII (Koller), antihemophilic globulin (Patek and Taylor), antihemophilic globulin A (Cramer), AHF (antihemophilic factor) (Brinkhous), PTF (plasma thromboplastic factor) (Ratnoff), plasma thromboplastic factor A (Aggeler), TPC (thromboplastic plasma component) (Shinowara), alpha-prothromboplastin (Fantl and Sawers), *facteur antihémophilique A* (Soulier), thromboplastinogen (Quick), prothrombokinase (Feissly), platelet co-factor (Johnson), plasmokinin (Laki), thrombokatilysin (Lengenhagger).

Factor VIII deficiency represents hæmophilia A, (alpha-hæmophilia), an hereditary hæmorrhagic condition which occurs mainly in males, but which is female sex-linked.

Factor VIII deficiency is indicated by several tests—recalcification time of plasma, serum prothrombin determination, whole-blood clotting time, blood thromboplastin formation, partial thromboplastin time. Factor VIII takes part with several other factors in the formation of blood thromboplastin.

Factor IX.

The synonyms of Factor IX are: Plasma factor X (Shulman), PTC (plasma thromboplastic component) (Aggeler), plasma thromboplastic factor B (Aggeler), Christmas factor (Biggs and Macfarlane), Factor IX (Koller), antihemophilic globulin B (Cramer), *facteur antihémophilique B* (Soulier), beta-prothromboplastin (Fantl and Sawers).

Factor IX deficiency is known as hæmophilia B, beta-hæmophilia or Christmas disease, named after a patient. Beta-hæmophilia is an hæmorrhagic disorder clinically resembling alpha-hæmophilia, and is inherited in similar way. Factor IX deficiency is indicated by several tests similar to those for the detection of Factor VIII deficiency; but, in contrast to Factor VIII, Factor IX is present in stored human plasma and in serum.

Factor IX takes part with several other factors in the formation of blood thromboplastin.

New Clotting Factors Under Consideration.

There is good evidence that tissues and blood contain perhaps a dozen or more components which are involved in blood coagulation and hæmostasis.

A number of additional factors have been described by various workers, who believe they have established that these factors play a role in clotting of blood. These factors are now under study by the Committee, and if the evidence indicates that the claims are valid, they will be assigned a Roman numeral.

The success of this Committee in medical communication and teaching will depend on the willingness of educators, editors and authors to adopt this system in their day-to-day efforts, and thus to influence and clarify the medical thinking and literature of the future.

The activity of the Committee has much wider significance than just the field of blood clotting, as is evidenced by an invitation of the National Advisory Heart Council of the United States to the members of this Committee to organize a series of international conferences within this field.

A novel, and it is hoped useful, idea was to invite to these conferences young workers of exceptional promise, so that they might listen to the discussion and benefit from the contact with their older colleagues from different countries in the world.

The Committee therefore is making a major contribution to international communication in medicine, and it is hoped that this type of activity will be seen more frequently.

British Medical Association.

WESTERN AUSTRALIAN BRANCH: ANNUAL MEETING.

THE annual meeting of the Western Australian Branch of the British Medical Association was held in the Nurses' Lecture Hall, Royal Perth Hospital, on March 14, 1959, DR. C. W. ANDERSON, the President, in the chair.

RETIRING PRESIDENT'S ADDRESS.

Dr. C. W. Anderson delivered his retiring President's address (see page 785).

INDUCTION OF PRESIDENT.

Dr. Anderson introduced the incoming President, Dr. D. D. Keall, and vacated the chair in his favour.

ANNUAL REPORT OF COUNCIL.

The annual report of the Council for the year ending March 14, 1959, was adopted. The report is as follows.

The President and members of the Council of the British Medical Association (Western Australian Branch) have much pleasure in presenting the sixtieth annual report of the Branch for the year ending March 14, 1959.

Membership.

The membership of the Branch has increased during the twelve months ended December 31, 1958, by a net amount of 30 as follows:

Membership at December 31, 1957		682
Losses:		
Transferred to other Branches	25	
Resigned	9	
Terminated—unfinancial	2	
Deceased	5	
	—	41
		641
Gains:		
Transferred from other Branches	40	
Elected	30	
Membership reinstated	1	
	—	71
Membership at December 31, 1958		712

Dr. J. Bentley and Dr. D. M. McWhae completed 50 years' membership of the Association on December 31, 1958.

Obituary.

With deep regret we record the deaths of the following members, which occurred during the year: Dr. A. R. Bean, Dr. H. M. Burns, Dr. H. B. Gill, Dr. S. Mathews, Dr. F. G. Stimson.

The sincere sympathy of the Branch is extended to the families of these late members. Council recorded the following resolution concerning the services to the Association of the late Dr. A. R. Bean, who had been a member of Council from 1955 until his death on March 21, 1958.

> That Branch Council express its deep regret at the death of Dr. Alan Reid Bean, places on record its appreciation of the valuable services rendered by him and tenders its profound sympathy to his family in their bereavement.

Meetings.

In addition to the annual meeting, seven general meetings of the Branch were held. The subjects of these meetings were as follows:

April: "The Enteric Viruses", Professor N. F. Stanley.
May: "Metabolic Disorders in Mentally Defective Children", Professor W. B. Macdonald.
June: "Sensitivity Effects of Aspirin", Dr. E. G. Strahan, and "Common Minor Rectal Disorders", Dr. S. Levitt.
July: "Biochemistry of Liver Function with Special Reference to Bilirubin", Dr. D. Curnow.
August: "Influence of Environment on Surgery", Professor F. A. R. Stammers.
October: "Emotional Development and Disorder in Relation to the Family", Dr. W. Rickard.
November: "Child Health Survey", Dr. A. Stewart.

Convocation.

Only one meeting of convocation was held during the year. The meeting proposed for March 23, 1958, was cancelled, it being the opinion of Council that there were not sufficient items of importance or of a policy nature warranting the calling together of convocation.

Council Meetings.

Twelve meetings, including one special meeting, of the Branch Council were held. The record of attendance is as follows:

C. W. Anderson (President)	12
A. A. Barr (Councillor)	11
D. M. Clement (Federal Councillor)	12
H. L. Cook (Councillor)	10
D. E. Copping (Honorary Treasurer)	4[1]

[1] Absent overseas from May until November, 1958.

A. L. Dawkins (Chairman of Convocation)	9
W. B. C. Gray (Councillor)	8
L. I. Henzell (Commissioner of Public Health)	6[1]
D. D. Keall (Vice-President)	12
R. L. Leedman (Honorary Secretary)	11
J. S. Lekias (Councillor)	8[2]
F. C. Macaulay (Assistant Honorary Secretary)	12
J. B. Mathieson (Commonwealth Director of Health)	9
A. A. Merritt (Past President)	11
R. S. W. Thomas (Councillor)	10

Office-Bearers and Councillors, 1959.

The following have been elected for 1959:

President: Dr. D. D. Keall.
Vice-President: Dr. D. M. Clement.
Honorary Secretary: Dr. R. L. Leedman.
Honorary Treasurer: Dr. P. D. Goatcher.
Honorary Assistant Treasurer: Dr. F. C. Macaulay.
Chairman of Convocation: Dr. A. L. Dawkins.

Federal Councillors Elected for 1959: Dr. C. W. Anderson and Dr. D. M. Clement.

The following have been elected as the five ordinary members of Council for 1959: Dr. A. A. Barr, Dr. D. E. Copping, Dr. W. B. C. Gray, Dr. J. T. Irvine, Dr. R. S. W. Thomas.

It is desired to express on behalf of the Branch the warmest appreciation of the work done by the retiring councillors.

Federal Council.

Dr. C. W. Anderson and Dr. D. M. Clement were the representatives of the Branch on the Federal Council and attended two meetings of the Federal Council during the year, full proceedings of which are recorded in THE MEDICAL JOURNAL OF AUSTRALIA. Branch Council wishes to record its deep appreciation of the work performed by these members on behalf of the Branch.

Representation.

The Branch was represented at various meetings and conferences during the past year as follows:

Council of the British Medical Association: Dr. Miles Formby.
Federal Council of the B.M.A. in Australia: Dr. C. W. Anderson and Dr. D. M. Clement.
Interim Faculty of Medicine: Dr. Leigh Cook.
Australasian Medical Publishing Co. Ltd.: Dr. C. W. Anderson, Dr. D. M. Clement and Dr. Leigh Cook.
"The Medical Journal of Australia" (Editor's Representative in W.A.): Dr. Leigh Cook.
State Health Council: Dr. D. M. Clement, Dr. Leigh Cook, Dr. I. O. Thorburn and Dr. M. F. Williams.
Health Education Council: Dr. A. A. Barr.
Nurses' Registration Board: Dr. R. H. Nattrass and Dr. L. E. LeSouef.
Silver Chain Association: Dr. C. W. Anderson.
Dental Board: Dr. I. O. Thorburn.
College of Dental Science: Dr. H. E. H. Ferguson.
Joint Committee with Underwriters' Association: Dr. Leigh Cook, Dr. H. M. Hill and Dr. G. B. Maitland.
St. John Ambulance Association: Dr. A. L. Dawkins.
Optometrists' Registration Board: Dr. D. D. Paton.
Sex Education (Parents and Citizens' Association): Dr. I. O. Thorburn.
Protection of Practices: Dr. L. A. Hayward and Dr. H. H. Stewart.
Anti-Cancer Council of W.A.: Dr. J. G. Hislop.
W.A. Council of Social Services: Dr. C. W. Anderson.
British Medical Agency Company: Dr. J. P. Ainslie, Dr. C. W. Anderson, Dr. A. L. Dawkins, Dr. R. D. McK. Hall, Dr. D. D. Keall, Dr. H. Macmillan, Dr. A. T. Pearson, Dr. G. S. Pestell and Dr. J. H. Stubbe.
Medical Library of W.A.: Dr. E. R. Beech, Dr. Leigh Cook and Dr. N. H. Robinson.
Tuberculosis Association of W.A.: Dr. V. A. F. Stewart.
Blood Transfusion Service: Dr. H. H. Stewart.
Department of Social Services Standing Committee on Rehabilitation: Dr. W. N. Gilmour.

Committees.

The following are the members of standing subcommittees appointed by Branch Council:

Publicity: Dr. C. W. Anderson (convenor), Dr. Leigh Cook, Dr. D. D. Keall, Dr. A. A. Merritt.

Medico-Legal: The President (convenor), Dr. A. A. Barr, Dr. B. A. Hunt.
Medico-Pharmaceutical: Dr. C. W. Anderson (convenor), Dr. A. A. Barr, Dr. B. C. Cohen, Dr. L. I. Henzell.
Ethics: The President (convenor), the Honorary Secretary, Dr. J. P. Ainslie, Dr. Leigh Cook, Dr. A. L. Dawkins, Dr. J. L. Day, Dr. L. E. LeSouef, Dr. A. A. Merritt.
Fees Advisory: Dr. J. P. Ainslie (convenor), Dr. J. L. Day, Dr. R. L. Leedman, Dr. F. C. Macaulay, Dr. H. Macmillan.
Committee to Confer with Benefit Organizations: Dr. Leigh Cook (convenor), Dr. C. W. Anderson, Dr. D. M. Clement.
Building: Dr. D. E. Copping (convenor), Dr. A. L. Dawkins, Dr. D. D. Keall, Dr. R. L. Leedman, Dr. A. A. Merritt, Dr. H. C. Pope, Dr. J. H. Stubbe.
Social Relations: Dr. B. W. Buttsworth (convenor), Dr. P. W. Atkins, Dr. H. S. Cohen, Dr. A. L. Dawkins, Dr. F. Macaulay.
Post-Graduate: Chairman, Dr. J. G. Hislop; Honorary Secretary, Dr. M. G. F. Donnan; Members of the Executive, Professor G. King, Dr. J. S. Lekias, Dr. F. C. Macaulay.
Hospital Policy: Dr. A. A. Merritt (convenor), Dr. J. P. Ainslie, Dr. E. R. Beech, Dr. J. Calder, Dr. D. M. Clement, Dr. Leigh Cook, Dr. A. L. Dawkins, Dr. J. L. Day, Dr. D. W. Fleming, Dr. C. Fortune, Dr. L. I. Henzell, Dr. D. D. Keall, Dr. H. H. Stewart.
Editorial: Dr. R. L. Leedman, Dr. A. A. Merritt, Dr. R. S. W. Thomas.

Amendments to By-Laws.

The following amendments to the by-laws of the Branch were made during the year:

By-law 16: Insert new paragraph 16 (*c*):

> Any member desiring to publish any advertisement concerning his profession or practice shall do so through the Council and not otherwise. Advertisements shall be confined to announcements of commencement or resumption of practice and change of address, as provided in 16 (*b*) above. Any member desiring an advertisement to be published shall forward all necessary particulars to the Secretary, who shall prepare the advertisement and arrange for its publication.

By-law 28: Delete and insert in lieu new By-law 28 as follows:

By-law 28:

(*a*) With the permission of Branch Council a member may be appointed Honorary Medical Officer to a sporting body which provides a service to the public, e.g. Surf Life Saving Club, and makes no charge for admission to view the sport, provided (i) he submits with his application to Branch Council a written request for his appointment from the sporting body concerned, (ii) the sporting body is advised that the name of the Honorary Medical Officer is not to be displayed (see footnote) and (iii) the Honorary Medical Officer only (1) gives advice as to the fitness or otherwise of members of the body to participate in that sport and (2) provides emergency treatment only. (After emergency treatment the patient shall be referred to his own medical practitioner.)

(*b*) With the permission of Branch Council a member may be employed as Medical Officer to a sporting body which charges the public for admission provided (i) he submits with his application to Branch Council a written request for his appointment from the sporting body concerned, (ii) that the sporting body is advised (1) of the relevant ethical rules, (2) that the name of the Medical Officer is not to be displayed (see footnote) and (iii) the Medical Officer only (1) gives advice as to the fitness or otherwise of members of the body to participate in that sport and (2) provides emergency treatment only. (After such emergency treatment, the patient shall be referred to his own medical practitioner.)

NOTE: It is emphasized that the Honorary Medical Officer or Medical Officer's name shall not appear in club rooms, or club stationery or programmes, or in any other way be publicized by a sporting body. The member concerned will be responsible for ensuring that these rules are strictly observed by the sporting body. Addresses to club members are regarded by Branch Council as addresses to lay audiences. (See By-law 24.)

(*c*) No member shall accept appointment as Honorary Medical Officer to any voluntary organization except as provided in By-law 28 (*a*).

[1] Dr. W. S. Davidson deputized for Dr. Henzell at two meetings.
[2] Absent overseas from December, 1958.

Public Health

We wish to take this opportunity of thanking Dr. Linley Henzell, the Commissioner of Public Health, Dr. W. S. Davidson, the Deputy Commissioner of Public Health, and Dr. J. B. Mathieson, the Commonwealth Director of Health, for their valuable cooperation and assistance during the year.

Legal Responsibilities of Medical Practitioners.

The Medical Board of Western Australia accepted a recommendation by Council that a brochure setting out the legal responsibilities of medical practitioners should be issued to all practitioners when first registering in Western Australia and periodically to all practitioners on the register.

Superannuation for Self-Employed Persons.

After two years of investigation, a trust deed for the introduction of the superannuation scheme for members of the profession in private practice was approved by the Taxation Department. Council appointed the original founders as trustees of the fund, and, a sufficient number of applications to meet the requirements of the *Taxation Act* having been received, the plan is now operating. Council feels that this plan will be of great value to members in providing for their retirement.

Advertising in Monthly Bulletins.

Council decided that members wishing to notify their colleagues of commencement or resumption of practice or change of address, may do so by means of a notice in the monthly bulletin to members.

Telephone Directory.

An announcement concerning the names and addresses of general practitioners in the metropolitan area was included in the pink pages of the 1958 telephone directory. Council has decided to continue this announcement, as it has been found that since its inclusion in the pink pages, inquiries for addresses of doctors in the metropolitan area previously directed to Branch office have now ceased and, more important, complaints of non-availability of doctors out of hours are now non-existent.

Interstate Transfer of Medical Registration.

Council has recommended to the Medical Board of Western Australia that a method of interstate transfer of medical registration should be introduced. It is realized that there are many difficulties in the way of the implementation of the suggestion. It is hoped that further examination of the problem may result in a solution to the present difficulties being found.

Medical Benevolent.

Council approved a suggestion that the activities of the Medical Benevolent Association should be taken over by a committee of Council.

B.M.A. House.

The alterations and additions to B.M.A. House, which were executed at a cost of approximately £17,500, were completed in August, 1958. On September 1, 1958, Branch office occupied its new quarters on the ground floor, and tenants occupied the whole of the available space on the first floor. The building was officially opened at a function held in the grounds of B.M.A. House on October 25, 1958, in the presence of some 310 distinguished guests, members and wives. The opening ceremony was performed by Mr. F. A. Hadley, the senior Past President of the Branch.

Repatriation Department.

Medical Benefits for Widows, Widowed Mothers and Dependants of Deceased Ex-Servicemen: Following considerable negotiation between Federal Council and the Repatriation Commission, the method of payment for medical treatment of dependants of deceased ex-servicemen whose deaths have been accepted as due to war service, was changed on January 1, 1959, from a capitation system to fee for service.

Convocation.

Council decided that if any group or member wishes to circularize convocation groups on a matter before the Association, such group or member shall submit their views in a letter to Branch Council, which will arrange for copies of the letter to be dispatched to convocation groups.

Workers' Compensation Cases.

Council commenced negotiations with all approved insurers for a review of the schedule of fees. The approved insurers were not prepared to accept a general increase in the rates applicable, but did agree that anomalies existing in the schedule should be removed.

Drunken Driving.

The *Traffic Act* was amended in September, 1958, to provide for the voluntary taking of blood samples from persons accused of offences against the *Traffic Act*. The method of taking the blood and administrative details concerning fees for this service are set out in the regulations of the *Traffic Act*.

K.E.M.H.: Ante-Natal Clinics.

A proposal to establish ante-natal clinics in a number of suburbs for use by public patients of K.E.M.H. was abandoned.

Ethics Committee.

The Ethics Committee adjudicated on one dispute between two medical practitioners, and at the request of the Honorary Staff, Royal Perth Hospital, examined from an ethical point of view a proposal relating to the collection of medical fees from intermediate patients.

Assistantship and Partnership Agreements.

Some years ago Council made available to members a standard *locum tenens* agreement. During this year Council approved standard assistantship and partnership agreements.

National Health Act: Schedules of Medical Benefits.

In September, 1958, Federal Council appointed a subcommittee to examine the schedules of medical benefits, with a view to making recommendations to the Government for removal of anomalies. All Branches were asked to examine the existing schedules and submit comments for examination by a subcommittee, which will present a report to the March, 1959, Federal Council meeting.

Model Infant Health Centre.

Council approved in principle a suggestion that a model infant health centre be established for the training of infant welfare sisters in modern techniques. It is proposed that the centre will also be used for the training of medical students.

B.M.A. Prize.

An annual grant of 50 guineas to the University of Western Australia was approved, to commence in 1959, to be known as the B.M.A. Prize, to be awarded to the medical student who obtains the highest aggregate marks in the final examinations. In addition to the cash prize, an engraved plaque will be presented to the winner.

B.M.A. Personal Accident Scheme.

B.M.A. London arranged through its Medical Insurance Agency for a policy to cover death by accident to be made available to members of the Association. A special rate of premium, much lower than available through normal insurance channels, was announced. The Branch, through B.M.A.C., is acting as agent for the Medical Insurance Agency Company in London, and many members have taken advantage of this type of insurance.

Social.

Medico-Legal Golf: The annual golf match between this Branch and the Law Society was held at Royal Perth Golf Club on Wednesday, October 8, 1958, and was voted most successful by all who attended the golf and a dinner which followed. The match resulted in a clear-cut victory for the medicos, the foursomes trophy being won by H. Macmillan and J. T. Irvine. B.M.A.C. trophies were won by R. Forbes (all square) of the Law Society, and the Lay Secretary of the Branch (1 up). The attendance at this function was excellent, and it is hoped that our members will be maintained or increased this year, the date of the fixture being the second Wednesday in October—October 14, 1959.

Cocktail Party: The annual cocktail party was held on October 25 in the grounds of 8 King's Park Road, in conjunction with the official opening of B.M.A. House.

British Medical Agency Company.

B.M.A.C. completed another successful year and again increased its contribution to the income of the Branch. The

support from members could be greater, and all members are requested to use the facilities of B.M.A.C. to their own and the Association's advantage.

Staff.

The Council wishes to express to the office staff its sincere thanks for their cooperation during the year.

Medical Benevolent Committee.

The report of the Medical Benevolent Committee for the year ended December 31, 1958, was presented by Dr. J. L. Day, and adopted. The report is as follows.

Members are aware that during the year it was considered desirable to transfer the activities of medical benevolence from a separate association to a committee of Council. Amendments to the rules of the Medical Benevolent Association to achieve this object were approved at a special meeting held at the Royal Perth Hospital on June 18, 1958. The funds of the Association, which at that point totalled £2679 4s. 4d., were formally accepted by Branch Council at its meeting on July 2.

Council asked the office-bearers of the Medical Benevolent Association to constitute the membership of the Medical Benevolent Committee of the Branch.

The expenditure during the year was in the nature of contributions to widows and to a doctor in necessitous circumstances, and totalled £387 10s. The income of the Committee continues to be derived from an amount of one guinea which is set aside from the subscriptions of the membership of the Branch, and for the year 1958 totalled £654 3s. In addition, interest on Commonwealth loans to the amount of £54 was received, making a total income of £708 3s. The balance held in the Benevolent Committee account on December 31, 1958, was £3128 7s. 4d.

It has become apparent to your Committee, particularly in the early stages of 1959, that there may be considerably greater drain on these funds than has occurred in the past. Early in 1959 it was found necessary to make a substantial interest-free loan to a member, and there are at present two cases before the Committee which may need considerable financial assistance. Your Committee is aware of the opinions expressed at previous general meetings that when the need arises, members of the profession will come forward with financial help. We would like to suggest that such financial assistance should come from the whole of the membership, and not from the willing few who are always ready to help. Your Committee therefore recommends that consideration be given to creating some reserve within the Branch's finances to which Medical Benevolent Committee can turn if and when the need arises.

JOHN L. DAY,
Chairman.

Library Report.

The report of the representatives of the Branch on the committee of the Medical Library of Western Australia was presented by Dr. E. R. Beech and adopted. The report is as follows.

Meetings have been held during the past year at which the B.M.A. grant for £500 was again renewed for the following year. Last year by no means was this grant used up, and again I would plead with practitioners, if they know of a book of general medical interest that they consider would be useful to the library, to write in a request either to the librarian or to one of the B.M.A. representatives and the matter would be considered.

The extent to which interest in the library is spreading may be shown by the figures for 1957 and 1958, when 6300 and 11,700 books and journals were borrowed from the library in the respective years. This means nearly double the number of books and journals were taken from the library in 1958 as compared with 1957. During last year, 706 new books were added to the library and 190 books or journals were donated. Last year 33 new journals were purchased for subscription. The medical library now receives approximately 284 journals by subscription or donation, costing £1270, while £2400 was spent on binding. Arrangements have been made for certain public health, physical medicine, rehabilitation and other journals not subscribed to by the medical library to be displayed in the library for ten days to a month. This has been made possible by the cooperation of the Department of Public Health, the Commonwealth Department of Social Services and some of the departmental libraries of the University of Western Australia. Approximately 75 journals are received in this way. All new books and journals are displayed in the library for two weeks and cannot be taken out, after which time they are circulated to any members who have reserved them.

Most of the anatomy books which were in the library previously have now been transferred to the preclinical library, and are housed there together with books and journals on physiology and biochemistry. These are still available to members of the B.M.A. on request at the library in the ordinary way.

During the year a special purchase of the journal collection of The Royal Australasian College of Physicians' library was made. This cost about £3000, which will have to come out of general library funds. This collection will be of great advantage in filling up numerous gaps in our journal library. We bought the whole of the collection, and from this we will have many duplicate copies which will be available for exchange with other libraries for further journals that we may need. Another special purchase which was made during the year was "The British Encyclopædia of Medical Practice", which will be kept in the medical library for reference only.

We would like to thank all those who have given books to the library, and suggest that anyone having a collection or series of journals could well give them to the library.

E. R. BEECH.

Post-Graduate Committee of Western Australia.

The report of the post-graduate committee for the year 1958 was presented by Dr. M. G. F. Donnan and adopted. The report is as follows.

The activities of the Post-Graduate Committee have this year closely paralleled those of recent years. There has been a lessening demand for sponsorship, and consideration is being had currently as to the merits of this in its present form. The advent of the School of Medicine has made a reappraisal of the constitution of the Committee desirable. It is realized that the School will contribute more and more to the activities of the Committee, and with its assumption of greater responsibility for post-graduate training, so should its voice be heard more prominently in the affairs of the Committee, until ultimately the Post-Graduate Committee becomes a Committee of the University, as applies in other States. However, the interests of the profession at large will have to be safeguarded to ensure that those of an esoteric coterie are not exclusively served.

The demands of sectional interests have often determined the extension of an invitation to a lecturer whose field of work was of limited appeal, but here the Committee acknowledges the financial assistance of the University School of Medicine and of the Department of Public Health.

Two country groups only have responded to the offer to provide them with visiting lecturers. Dr. Fortune visited Kalgoorlie and Dr. Thorburn and Professor Lewis lectured at Narrogin.

The profession heard Professor Stanley lecture on "The Enteric Viruses" in April and, in May, Professor Macdonald spoke on "Metabolic Disorders in Mentally Defective Children". In this month also, Professor Gaddum visited Perth and delivered two lectures, "Clinical Pharmacology" and "Isotopes".

In June, Dr. Strahan and Mr. Levitt proffered papers on topics in which they have an especial interest.

Dr. Curnow, of the Department of Biochemistry, Royal Perth Hospital, addressed the profession in July on "Biochemistry of Liver Function with Special Reference to Bilirubin".

The month of August was an occasion of intense post-graduate activity, with visits from the Pfizer lecturer, Professor Wintrobe, Professor and Head of the Department of Internal Medicine at the University of Utah, College of Medicine, Salt Lake City, Utah; of Dr. Milne, of the Post-graduate School of Medicine, Hammersmith; of Professor Illingworth, of Glasgow, Tooth lecturer; and of Professor Stammers, of Birmingham, Category "A" lecturer for 1959. The latter two also participated in the proceedings of the annual meeting of the Royal Australasian College of Surgeons.

In September, Professor McKelvey, of the University of Minnesota, lectured in his specialty of obstetrics and gynæcology.

In October, opportunity was taken of an offer by the Australian Association of Psychiatrists to combine with them in the presentation of the monthly clinical meeting of the British Medical Association.

November was the occasion of visits by Dr. Austin Eagger, Medical Director of the Slough Industrial Health Service, visiting Australia under the ægis of the Nuffield Foundation, and by Dr. Alice Stewart, Reader in Social Medicine in the University of Oxford, who proffered explanation and assessment of her work to the profession.

Dr. Marjory Warren, Consultant Physician to the Geriatric Unit, West Middlesex Hospital, visited Perth in

December, and proffered advice to the profession and its ancillaries.

The post-graduate programme of 1959 commenced in February with lectures from Professor Johnstone, Professor of Radiology in the University of Leeds, and by courtesy of the Royal Australasian College of Surgeons, from Mr. Gissane, Sims Travelling Lecturer for 1959.

Such a spate of lecturers is now offering that the Committee must be selective if the monies available to it are to be used to the greatest advantage.

A course of post-graduate study, suitable for Part I, F.R.A.C.S., was organized and 17 doctors enrolled for the course. This function of the Committee will now be assumed by the Royal Australasian College of Surgeons, but care will be had that practitioners seeking surgical post-graduate refreshment, without intention of proceeding to higher qualification, are not denied the opportunity.

An innovation this year has been a detailed statement of all post-graduate activities in the medical community, as made known to the Committee and published in the B.M.A. Bulletin.

Throughout the year, the Committee has had the utmost cooperation from the Board of Management of the Royal Perth Hospital in the provision of facilities for the conduct of its meetings, and this is gratefully acknowledged.

The cost of medical post-graduate education in Western Australia is greatly assisted by a Government grant, which in recent years has been £750 *per annum*. This amount covers the cost of travelling, accommodation and lecture fees for visiting lecturers, and also meets a small proportion of the administrative costs. The great bulk of the cost of administration of the Post-Graduate Committee is met by the Branch, which, apart from charges made for specific courses, makes no monetary demand on the profession for attendance at any lecture.

M. G. F. DONNAN,
Honorary Secretary.

REPORT OF THE HONORARY TREASURER.

The Honorary Treasurer's report was submitted by Dr. D. E. Copping and adopted. The report is as follows.

The most doleful of men, if he stood here this evening as Honorary Treasurer of the Western Australian Branch of the B.M.A., could not prevent a note of cheerfulness creeping in as he reported on the financial affairs of the Branch for the year ending December, 1958.

The balance sheet and the statement of income and expenditure have laid bare the stewardship of your Council during the past year.

In this report I do not intend to deal with the Financial Statement in great detail, but I would like to comment on one or two of its more important features and offer some thoughts arising therefrom.

The Building.

For purposes of management and accountancy, the building is in the name of the British Medical Agency Company. The original cost of the building and furniture and the recent extensive alterations and new furnishings amounted to nearly £35,000. B.M.A.C. has discharged the whole of this debt by means of a loan from the B.M.A. Branch. When this bank debt is offset against our accumulated surplus income and certain other funds we are holding, the remaining debt on the building is approximately £14,000. I believe that this must be regarded as a very satisfactory position to have reached in only four years.

The Surplus.

The excess of income over expenditure is £4186 and this follows a surplus of £3600 last year.

The fortunes of the Branch have undergone quite a dramatic change over the past three years, and I believe the members will be interested in the reasons for this change.

Increased Membership. The membership now stands at 716 as against 522 five years ago, and it has not been necessary to increase the size of our secretariat to handle the additional work. Consequently, the cost of administration has fallen as a proportion of the subscription income. However, this process of increasing membership without expanding our office staff cannot go on indefinitely. We must keep in mind the day when Mr. Hayward will need an assistant, and the volume of work will demand more typewriters and more hands to operate them.

Mr. Hayward has brought to our office an efficiency and willingness which has impressed all members. However, his very virtues constitute a hazard. We do manage to carry on the office during the Secretary's holidays during the slack month of January, but it is with some difficulty. I ask you, then, to consider the confusion, if not actual chaos, which would arise if sickness removed Mr. Hayward for any considerable period. Opinions will differ as to when the Secretary will actually have to have a responsible assistant; but, in my own mind, that day is not very far off. Not only as an insurance against the risk of illness and to lighten the load of his night and week-end work, but also to make possible something Mr. Hayward has always wished to do and something Council originally hoped that a full-time Secretary would be able to do—namely, to get out of the office and visit our country members, so that Council would be better informed of their problems and needs.

Therefore, I recommend to the new Council and to my successor as Honorary Treasurer that this need be kept in mind and that plans be made accordingly.

B.M.A.C. The second reason for our buoyant finances is the prosperity of B.M.A.C. This Company provides innumerable services for the members, and an increasing number is realizing that a great deal of their personal business can be reliably effected by a simple telephone call to B.M.A.C. As a result B.M.A.C. is now showing a useful profit after meeting its expenses and taxation commitments, and this profit is enjoyed by the Branch.

This seems a convenient moment to remind ourselves that it was always intended that the profits from B.M.A.C. should be devoted to acquiring a home for the Branch, and I believe that the directors of the Company have this very much in mind. That being so, we have a moral obligation to segregate in our minds, if not formally on paper, the revenue of B.M.A.C. as distinct from the Branch—at least until the building in King's Park Road is paid for and fully adapted to the needs of the members. If we make this separation of funds, then the surplus becomes a much more modest one. The budget figures for the current year show that, if B.M.A.C. did not exist, our surplus next December would be no more than £1100.

Interest-free Loans. This is the third reason for our surplus. As Honorary Treasurer I express the thanks of Council to all those members who have deposited with the Branch their temporarily surplus funds. The measure of this aid is indicated in the Balance Sheet, which shows that there was £14,881 on free-of-interest loan at December 31. Without the assistance of these loans, we would have paid in the past year something of the order of £800 in interest on the building overdraft. In actual fact, our total interest bill for the year was only £18.

Secretarial Efficiency. The extraordinarily good housekeeping of the Secretary accounts in no small measure for the healthy state of our finances. Without his efforts and those of his staff, the other fortunate circumstances already discussed could not have been turned to such good account.

Subscriptions.

The outgoing Council had in mind recommending to the new Council that the annual subscription be reduced by two guineas over the next year or so. It is hoped that this may still be possible, but two uncertainties have arisen in the past few months which makes it impossible to prepare an accurate budget at the moment. Towards the end of the year, the Commissioner for Taxation pointed out that the Branch had not supplied him with a taxation return. This was quite true. The Branch never has done so. We believe that it is very unlikely that the Branch will be liable for any taxation, but until the Commissioner makes his decision, we cannot be sure. And secondly, we have very recently had word via Federal Council that the parent body in London may be forced to raise the capitation charge for its overseas members. The proposed increase would cost this Branch approximately £1500 a year. This matter will remain in doubt until a decision is made at the Annual Representative Meeting held in Britain next July. These are our present rates of subscription:

	Per week	(*per annum*)
Full metropolitan subscription ..	6s. 0d.	(15 guineas)
Full country subscription	4s. 10d.	(12 guineas)
Recent graduate of 1 and 2 years' standing subscription	2s. 5d.	(6 guineas)
Metropolitan Salaried Service ..	4s. 5d.	(11 guineas)
Country Salaried Service	3s. 8d.	(9 guineas)

Actually the subscriptions to the working funds of the Branch are a guinea *per annum* less than these figures for each category, excepting recent graduates, because one guinea from each member is automatically transferred to our medical benevolent activities.

With our new financial stability, it seems that our days of living from hand to mouth are over. What, then, of the future? What is to be our policy on subscriptions and Branch finances? As I see it, we have to make a decision to go in one of two directions. Either we take the view that the Branch finances should be managed like those of, say, a social club, and that we should ask from our members no more than is needed to cover our costs from year to year. Or, we take the broader view that the B.M.A. is an important organization in the community, with a part to play if it is to maintain the good name of the profession, and that it has a duty to serve its members in a number of ways not possible at present. To do these things would require financial reserves which we have never previously had. I believe that such reserves should be accumulated, and specifically I recommend that, over the years, we aim for

BRITISH MEDICAL ASSOCIATION (WESTERN AUSTRALIAN BRANCH).

Statement of Income and Expenditure during Twelve Months Ended December 31, 1958.

INCOME.	£ s. d.	£ s. d.
By Members' Subscriptions		9,249 6 6
„ Interest:		
(a) Commonwealth Bonds, etc.	213 19 3	
(b) Aust. Med. Pub. Co. Ltd.—		
(i) Debentures Series A-D	26 5 0	
(ii) Debentures Series E	146 2 2	
		386 6 5
„ British Medical Agency Company Revenue Account		1,802 5 7
		£11,437 18 6

EXPENDITURE.	£ s. d.	£ s. d.
To Subscriptions to:		
(a) Members' Journals—		
(i) Aust. Med. Pub. Co. Ltd.	693 10 0	
Less Series E Debentures	346 15 0	
		346 15 0
(ii) B.M.A., *London*		1,097 15 8
		1,444 10 8
(b) Federal Council—Capitation		843 15 0
(c) Medical Benevolent Committee		654 3 0
(d) Flying Doctor Service		1 1 0
(e) Historical Society of W.A.		1 1 0
		2,944 10 8
„ *Cost of Administration:*		
Audit Fees	21 0 0	
Car Expenses—Secretary	165 19 3	
Depreciation	44 6 0	
Duplicating	17 6 3	
General Expenses	39 0 5	
Legal Expenses	17 12 6	
Medical Library of W.A.	250 0 0	
Medico-Political Expenses	79 8 0	
Postages and Petty Cash	213 12 7	
Printing Expenses	144 7 8	
Salaries	3,045 15 4	
Stationery	31 6 4	
Superannuation—Secretary	200 0 0	
Telephone	36 18 9	
		4,306 12 6
		7,251 4 2
„ Excess of Income over Expenditure		4,186 14 4
		£11,437 18 6

Statement of Assets and Liabilities at December 31, 1958.

ASSETS.	£ s. d.	£ s. d.
Subscriptions in Arrears		277 2 0
Investments:		
(a) Aust. Med. Pub. Co. Ltd.—		
(i) Debentures A-D	420 0 0	
(ii) Debentures E	2,669 5 0	
	3,089 5 0	
(b) Commonwealth Bonds	3,110 0 0	
(c) B.M.A.C. Shares	9 0 0	
		6,208 5 0
Fixed Assets:		
B.M.A.C.—B.M.A. House Loan Account	24,272 5 2	
Furniture and Fittings as at January 1, 1958	£886 1 9	
Less Depreciation	£44 6 0	
	841 15 9	
		35,714 0 11
		£42,199 7 11

LIABILITIES.	£ s. d.	£ s. d.
Subscriptions in Advance		29 8 0
Bank of New South Wales—Overdraft		5,110 10 5
Sundry Funds in Credit:		
B.M.A. House—Members' Loan Account	14,881 0 8	
Building Fund	1,685 4 3	
Car Badge Account	57 19 2	
Cocktail Party Account	65 11 4	
Entertainment Fund	18 17 3	
Library—Donations Account	27 11 2	
Library—Cyril Bryan Fund	179 18 1	
Library—Harry Lucraft Fund	22 1 0	
Medical Benevolent Committee	3,128 7 4	
Medico-Legal Golf	15 8 2	
Nelson Bequest	17 7 1	
Post-Graduate Committee Account	144 8 6	
Post-Graduate Grant Account	97 3 9	
Publicity Fund	75 5 4	
World Medical Association Fund	1 1 0	
		20,417 3 11
Accumulated Reserve Account:		
Balance at January 1, 1958	12,455 11 3	
Add excess of income over expenditure	4,186 14 4	
		16,642 5 7
		£42,199 7 11

I report that I have audited the accounts of the British Medical Association (Western Australian Branch) for the year ended December 31, 1958. In my opinion the accompanying balance sheet is properly drawn up and exhibits a true and correct view of the state of the Association's affairs as at December 31, 1958, and the attached income and expenditure account is also properly drawn up and exhibits a true and correct view of the Association's affairs for the year. Both are in accord with the best of the information and explanations given to me, and as shown by the books of the Association.

Perth, Western Australia.
February 2, 1959.

(Signed) E. B. JACKMAN, A.A.S.A., A.C.I.S.,
Auditor.

a reserve of £100 per member. On present figures, we could achieve this sum in a period of 10 to 12 years. If in, say, ten years' time we had a reserve of £50,000 behind us, we would have some financial teeth.

What would we do with a reserve of this order? It would produce an income of about £3000 a year, and this would pay for an assistant secretary when this becomes necessary. It would also enable us to meet such continuing demands from our members for social rooms in B.M.A. House; for better public relations; for more medico-political activity (and on this point, do not let us delude ourselves that the present political calm means that we will never have to do battle again as we did ten years ago). Also, we could assist younger men starting in practice, and we could give more help to the few members who fall on hard times and to those families left in hardship. And again, in accordance with the first Article of our Memorandum of Association, "The promotion of Medical and Allied Sciences", we might make a start in supporting certain scientific activities. To discharge many of these duties in the past, Council has had to appeal for funds. The results have never been outstanding, and it has always been the minority which has responded. I hope that the day of appeals has gone for ever, for I believe that it is much fairer that all should contribute through their subscriptions. Before we decide to reduce our subscriptions down to bare subsistence, I would like to see a ballot of the members to see how great is the demand for this reduction. A few voices are heard repeatedly in this demand, but I do not believe that Council has the evidence that they speak for the majority.

Are our subscriptions really too high? As we have seen, the full subscription rate is a matter of some 6s. a week. Actually, of course, the cost is a good deal less than this, because it is a taxation deduction. The net cost of the full subscription, therefore, lies in the range of 2s. 6d. to 4s. a week. And this covers two weekly journals.

Superannuation Scheme.

In December, we at long last received the approval of the Commissioner for Taxation for the Trust Deed of the Medical & Allied Professions Superannuation Scheme. This scheme has now been launched, and the first contributions invested on behalf of its members.

A great deal of work had to be done to organize this scheme, but we believe that it will be well worth it, and will be of great benefit to the self-employed members of the Branch.

B.M.A. Prize.

During the year the Council decided to make an annual donation of fifty guineas for a B.M.A. prize for the best medical student in the final year.

APPOINTMENT OF AUDITOR.

It was resolved that Mr. E. B. Jackman, A.A.S.A., A.C.I.S., be appointed auditor to the Branch for the ensuing year.

VOTES OF THANKS.

Dr. H. Macmillan, on behalf of the members of the Branch, expressed appreciation of the work performed by the members of the outgoing Council. It was resolved unanimously that the appreciation of the Council's work should be recorded in the minutes.

Out of the Past.

In this column will be published from time to time extracts, taken from medical journals, newspapers, official and historical records, diaries and so on, dealing with events connected with the early medical history of Australia.

A PRACTICAL PROTEST.[1]

[From the *Australasian Medical Gazette*, November, 1882.]

THE relations of the Government of N. S. Wales with the medical profession are most unsatisfactory, and it is time that medical men as a body took some action that shall forcibly bring the present state of things prominently before the public. The people of this colony, through the absence of proper legislation, are absolutely unable to know whether any man who chooses to practise medicine has had such training as would qualify him to do so. He has only to put a brass plate on his door, and he is at liberty at once to exercise all the rights and privileges which should be confined to those men who have proved to a properly qualified tribunal that they have had the necessary education and passed such examinations as prove their fitness for practice. As it is, the medical evidence of unqualified practitioners is accepted in courts of law, in one instance to our knowledge in a capital case, in which the prisoner was convicted and sentenced to death. Their certificates as to the cause of death are received by the registrars, post-mortem examinations are made by them, and their evidence taken in coroner's courts. In fact, as between the Government and the practitioner, they are in absolutely a better position than legally qualified men, who possess qualifications properly registered, the latter being by the Medical Witnesses Act obliged, on the order of a coroner or any justice of the peace, to go any distance to make a post-mortem examination for the payment of two guineas, to give evidence for one guinea more, with no mileage allowance for the first ten miles of their journey, and then only a shilling a mile afterwards, or be liable to have a fine of forty pounds levied on their goods and chattels, failing these to suffer imprisonment. The former are liable to none of these disagreeables. Not being legally practitioners, they are able to defy such an order, and as we have known done, to make a bargain by which the coroner guarantees handsome remuneration before they attend to make a post-mortem examination and give evidence. This colony is a very paradise for quacks.

[1] From the original in the Mitchell Library, Sydney.

Correspondence.

BLOOD PRESSURES IN AUSTRALIAN ABORIGINES.

SIR: While I can make no claim to a knowledge of anthropology, I am sure that anybody with any knowledge of Torres Straits Islanders would dispute the contention on page 631 (MED. J. AUST., May 9, 1959) that these people "are of mainly Australian aboriginal descent, though there is a slight Melanesian admixture". After three years' observation on the Islands and the far northern parts of Cape York Peninsula, I would suggest that the only point of similarity between the two races is colour.

Yours, etc.,
D. A. DOWNING.

75 Yabba Street,
Ascot,
Brisbane.
May 12, 1959.

AN APPRECIATION.

SIR: On May 19, 1959, the honorary medical officers of the Eastern Suburbs Hospital held a clinical evening at Eastern Suburbs Hospital, to which the local general practitioners were invited. This gave the latter the pleasure of meeting the visiting specialists to whom they refer patients. Six short lectures of about fifteen minutes each were delivered by members of the honorary staff on subjects of everyday importance and interest to general practitioners. Questions were invited at the end of the series. I would like to use your columns to express my appreciation of the spirit in which this evening was held, and of the work involved in preparing the lectures.

Yours, etc.,
G. R. FAITHFULL.

Cr. Carrington Road and Clovelly Road,
Randwick, N.S.W.
May 20, 1959.

CANCER—POST-GRADUATE EDUCATION.

SIR: In the latter part of 1958 this Council distributed gratis, to every medical practitioner registered and practising in this State, copies of the monographs "Carcinoma of the Breast" and "Cancer of the Female Genital Tract". The view that these monographs were excellent publications, which would materially assist in keeping the profession informed on cancer, was unequivocally supported by their enthusiastic reception by doctors generally.

Council therefore decided to extend its campaign by purchasing supplies of the monographs "Cancer of the

Œsophagus and Stomach", "The Diagnosis of Genito-Urinary Neoplasms" and "Cancer of the Colon and Rectum". In addition, consideration will be given to the acquisition of "Cancer of the Lung" when its revision has been completed. These monographs will be similarly made available gratis to all members of the medical profession. It is also proposed to provide copies of each of the monographs to final year medical students.

Within the next few weeks it is hoped that every doctor will receive his copy of "Cancer of the Œsophagus and Stomach". Copies of "The Diagnosis of Genito-Urinary Neoplasms" and "Cancer of the Colon and Rectum" will be available later. It is again pointed out that only one copy can be issued to each doctor and student, and it will not be possible to replace lost copies.

Any comment on the value of these publications would again be welcomed by Council.

Yours, etc.,
ALAN B. LILLEY,
Medical Director.

The New South Wales State Cancer Council,
Agriculture Building,
Farrer Place,
Sydney.
May 8, 1959.

ŒSOPHAGEAL HIATUS HERNIA.

SIR: I am prompted to write on this subject after seeing the figures of Dr. S. J. M. Goulston, as referred to by Dr. C. J. Officer Brown and Dr. Kenneth N. Morris in THE MEDICAL JOURNAL OF AUSTRALIA, May 9, 1959.

During the last five years that I have been overseas, the problem of hiatus hernia has been as much discussed there as in this Journal. It is agreed that the most difficult complication to treat of a sliding hiatus hernia, is stricture following persistent œsophagitis or ulcer. Logically the ideal treatment of these cases is cure of the hernia before stricture and irreversible change occur. Thus all patients with persistent symptoms of hiatus hernia and fit for surgery warrant œsophagoscopy.

If œsophagitis is present, operative repair of the hernia should be carried out in the near future, for (as Officer Brown and Morris point out) irksome conservative treatment palliates but can never cure the hernia, and these people run the risk of permanent damage from continued gastric regurgitation.

If the œsophagus is normal, a trial of conservative treatment is justified after excluding other possible conditions such as peptic ulcer, biliary disease or abdominal carcinoma, the symptoms of which, as Tanner[1] emphasized in a discussion at the Royal Society of Medicine in 1957, are often ascribed to a radiological hiatus hernia.

I agree with Dr. Goulston that para-œsophageal hernia is a separate entity. It gives rise to different symptoms and complications, and the majority merit operation.

Finally I would like to advocate the abdominal approach: firstly, because I find it is a shorter operation and gives a direct view of the crural region for repair; secondly, and equally important, because it allows exploration for an intraabdominal lesion.

Yours, etc.,
WALTER BURFITT-WILLIAMS.

175 Macquarie Street,
Sydney.
May 22, 1959.

INTIMAL HÆMORRHAGE IN ATHEROMA.

SIR: Since it is possible there are some who believe that the above happening, as a matter of importance, had been laid to rest and the final obsequies completed when a distinguished pathologist in our midst labelled as "mystics" those who favoured unduly its incidence, I feel that attention should be drawn to its resurrection in a leader of the *British Medical Journal* of April 11 last, which deals with further confirmation of the previous findings by Dr. J. C. Paterson of London, Ontario. He and his co-workers have found that hæmorrhages into atherosclerotic plaques are extraordinarily frequent as shown by the presence of hæmosiderin, an iron derivative of disintegrated hæmoglobin.

My interest centres around numerous occasions where—in cases of pain due to coronary artery disease proved by subsequent happenings—no difficulty arises in integrating or envisaging an intimal hæmorrhage in terms of symptoms and electrocardiograph findings. To clarify this somewhat assured statement, may I cite two sets of circumstances, familiar to what must be the majority engaged in general medical practice: (i) patient with first attack of moderate, somewhat prolonged chest pain a few hours or days previously, followed by a well period, then a cataclysm with frank, perhaps fatal, occlusion; or (ii) a series of such happenings, with little or no exertional pain in the well periods, ending eventually in classical coronary occlusion, the post-mortem findings, should such be available, being patches of fibrosis suggesting healed infarction.

I find it difficult to accept vasospastic phenomena of angina or transudation into the myocardium as applicable to both these cases.

In regard to case (i), there are some who will say that this situation is a classical instance of a minor infarct that subsequently spread; possibly; but is it not as reasonable to envisage an intimal hæmorrhage into a vascularized atherosclerotic plaque, the ruptured vessels at the periphery of the plaque adding to a hæmatoma that bulged into the lumen setting up a thrombosis or a ventricular fibrillation with, perhaps, sudden death, yet *post mortem* there is no occluded vessel to be seen, nor, for that matter, an intimal hæmorrhage unless looked for with the painstaking care of Paterson, Wartman and others? For added measure, if diligently sought for, there will be transient *S-T* deflection at some period in the electrocardiogram.

Having said this much of the necessity to relate the mechanics of the coronary episode to a concept of the underlying pathology and electrophysiology, I should like to observe that it is a matter of conscience to explore any avenue that might lessen the incidence of this number one killer of man at an age all too brief for him to reap the reward of a life well done; in the last analysis, it should be our aim that the sufferer be not mishandled nor committed to unnecessary bed rest with its attendant impact on his spirit and his own and the public purse.

Finally, in terms of the season, the leader takes us to a trinity of views, in treating with cause and effect of atheroma in intimal hæmorrhage; embraces the vascular, lipid, and mechanical and encrustation theories of Winternitz, Allbutt, Duguid and others; and thus invites us not to forget the past. How wise! How true!

Yours, etc.,
W. J. MCCRISTAL.

The City Mutual Life Assurance Society Limited,
Hunter and Bligh Streets,
Sydney.
May 26, 1959.

THE SECOND MEDICAL SCHOOL IN NEW SOUTH WALES.

SIR: It should not be too late to rectify the plan to build two hospitals instead of one for the second medical school.

Apparently the Council of the University of New South Wales and the State Government intend to follow the advice of the Government Advisory Medical Committee to build a small hospital of 200 beds at the University of New South Wales and use a large hospital of about 1000 beds expected to be made at the Prince of Wales site, Randwick.

It may not be realized that the present scheme to have a small university hospital is contrary to the ideas of leading authorities, including the Goodenough Report, quoted by the Government Advisory Medical Committee, who then contradicted their quotations which recommended the ideal, a geographically unified medical school.

The Committee quoted the following passages from the Goodenough report on geographic unity:

Page 71, paragraph 35: "... Nevertheless, the ideal arrangement, from the point of view of both teaching staff and students, is to have all the hospital facilities required by a medical school in the immediate vicinity of the school, preferably on the same site . . . "

Page 15, paragraph 5: "Ideally, the medical school, the teaching hospitals and such clinics as are used for teaching purposes should be situated on the same or adjacent sites so that the teaching centre is a compact geographical unit . . . "

Page 25, paragraph 2: "The ideal to be aimed at, though it may not be capable of full realization in every case, is

[1] *Proc. roy. Soc. Med.*, 1958, 51:31 (January).

for the pre-clinical departments to be organized in the closest association with other university departments and also with the parent teaching hospital of the medical school."

After quoting the above, the Government Advisory Medical Committee rejected the idea of a single large university hospital, saying:

> The majority of the Committee were very critical of such a proposal quite apart from the expense and delay involved in its design and erection. It was pointed out that the establishment of a dominant University hospital reacts unfavourably upon the growth and development of other teaching hospitals. Finance, staff, facilities and equipment are more likely to find their way into such a University hospital.

These two reasons were the only ones given for rejecting the single large university hospital and should be examined. The first reason, "expense and delay in design and erection", is illogical, as they did not apply it to the large hospital they expected to be built outside of the University of New South Wales. We have the extraordinary situation of the Government Committee telling the State Government that their creation, the University of New South Wales (previously the University of Technology), could not satisfactorily build a large hospital. The Government Committee did not have a high opinion of the technological capabilities of the University of Technology they chose as headquarters for the second medical school in New South Wales.

The other reason given by the Committee rejecting the large university hospital was that a "dominant University hospital reacted unfavourably upon the growth and development of other teaching hospitals". In a few words they overrule the Goodenough Report and modern thinking.

It was also illogical of the Government Committee to approve of centralization of some hospital services such as supplies, laundry, power and accommodation for nurses for the two hospitals, but to disapprove of centralization where it is most necessary in education and medical service.

The establishment of a medical school at the University of New South Wales is not necessarily unwise, provided that the University is autonomous and that there is academic freedom; but the fact that the Council of the University accepts the plan for a small university hospital shows that it is not autonomous. The present situation is an admission that the University of New South Wales does not have the fundamental freedom necessary to a university. It is not undertaking to design the type of medical school that it should.

In conclusion, there is no reason why we cannot have the best of plans for a second medical school either at the University of New South Wales or elsewhere, but the present scheme is not it.

Yours, etc.,

ALAN GRANT.

225 Dunbar St.,
Stockton, N.S.W.
June 1, 1959.

Post-Graduate Work.

THE POST-GRADUATE COMMITTEE IN MEDICINE IN THE UNIVERSITY OF SYDNEY.

Post-Graduate Conference at Albury.

THE Post-Graduate Committee in Medicine in the University of Sydney, in conjunction with the Melbourne Medical Post-Graduate Committee and the Border Medical Association, announces that a post-graduate conference will be held at the Albury Base Hospital on Saturday and Sunday, June 20 and 21, 1959. The programme is as follows:

Saturday, June 20: 2 p.m., registration; 2.30 p.m., "Recent Advances in Gastro-Intestinal Disorders", Dr. W. E. King: 4 p.m., "Failure to Thrive in Infancy"; Dr. H. N. B. Wettenhall; 5 p.m., "The Scope of Modern Cardiac Surgery", Mr. Kenneth Morris.

Sunday, June 21: 9.30 a.m., "Management of Diseases of the Thyroid Gland", Dr. W. E. King; 10.30 a.m., (*a*) "The Surgery of Arterial Disease", (*b*) "The Management of Chest Injuries", Mr. Kenneth Morris; 11.45 a.m., "Some Aspects of Endocrine Disorders in Childhood', Dr. H. N. B. Wettenhall.

The fee for attendance at the course is £3 3s., and those wishing to attend are requested to notify Dr. R. Hayter, Honorary Secretary, Border Medical Association, North Street, Albury, as soon as possible. Telephone: Albury 557. Arrangements have been made by the Melbourne Medical Post-Graduate Committee for their annual subscribers to attend without fee.

WEEK-END COURSE IN THE USE OF RADIOACTIVE ISOTOPES IN MEDICINE.

The Post-Graduate Committee in Medicine in the University of Sydney announces that a week-end course in the use of radioactive isotopes in medicine will be held at The Royal North Shore Hospital of Sydney on Saturday, July 25, and at St. Vincent's Hospital on Sunday morning, July 26, 1959. By arrangement with the New South Wales State Cancer Council, the course will be free to all medical practitioners. A period for discussion will be provided at the conclusion of each subject. The programme is as follows:

Saturday, July 25, in the Student's Lecture Room, Royal North Shore Hospital. First Session, chairman Dr. A. B. Lilley: 9.30 a.m., opening address, Dr. Selwyn Nelson; 9.45 a.m., "Derivation and Meaning of Standards of Radiation Safety", Dr. G. M. Watson; 10.15 a.m., "Radioactive Isotopes—Legislative Aspects", Mr. B. W. Scott. Second Session, chairman Dr. W. A. Conolly: 11.30 a.m., "Isotopic Measurement of Cardiac Output", Dr. W. A. Seldon; 12 noon, "The Use of Iodine 131 in the Treatment of Angina Pectoris", Dr. Frank Ritchie; 12.30 p.m., "Lipid Tolerance in Coronary Disease", Dr. G. V. Hall. Third Session, chairman Dr. M. S. Alexander: 2 p.m., "Radioactive Iodine in Thyroid Disease", "Diagnosis", Dr. I. D. Thomas, "Treatment", Dr. F. F. Rundle; 3 p.m., "Renal Function Studies Using Iodine 131 Labelled 'Diodrast'", Dr. E. P. George. Fourth Session, chairman Dr. H. G. Wallace: 4 p.m., "The Uses of Radioactive Isotopes in the Diagnosis of Malabsorptive States", Dr. M. R. Playoust; 4.30 p.m., "Assessment of Fluid Volumes by Isotope Dilution Techniques", Dr. E. P. George.

Sunday, July 26, Students' Lecture Room, St. Vincent's Hospital. Fifth Session, chairman Dr. H. M. Rennie: 9.30 a.m., "Uses of Radioactive Isotopes in Hæmatology with Particular Reference to Iron 59", Dr. R. J. Walsh; 10 a.m., "Assessment of Vitamin B_{12} Absorption", Dr. P. K. Lamond; 10.20 a.m., "Chromium 51 in Blood Volume and Red Cell Survival", Dr. P. K. Lamond; 10.40 a.m., "The Use of Radioactive Phosphorus in the Treatment of Blood Diseases", Dr. I. S. Collins. Sixth Session, chairman Professor B. T. Mayes: 11.50 a.m., "Isotopic Placental Localization", Dr. D. H. McGrath; 12.20 p.m., "Labelling of Cancer Cells with Radioactive Chromium", Dr. E. E. Selecki; 12.40 p.m., "Treatment of Malignant Effusions with Radioactive Gold", Dr. T. S. Reeve.

Applications.

In order that suitable catering facilities may be provided, those wishing to participate are requested to make application to the Course Secretary, the Post-Graduate Committee in Medicine, 131 Macquarie Street, Sydney. (Telephones: BU 4497-98.) The closing date for applications is Friday, July 17, 1959.

THE MELBOURNE MEDICAL POST-GRADUATE COMMITTEE.

PROGRAMME FOR JULY, 1959.

Visit of Professor Farquharson.

As was set out in previous notices, Professor R. F. Farquharson, of Toronto, will give evening lectures in Melbourne on June 22, 25, and 29 and on July 2, and will visit hospitals.

Country Course at Koroit, July 11.

The change in the date of the country course at Koroit, to July 11, should be noted. The programme is as follows: 3.45 p.m., "Orthopædic Problems Commonly Mismanaged", Mr. Bryan Keon-Cohen; 5.15 p.m., "Recent Advances in Pædiatrics", Dr. M. J. Robinson.

The local secretary for this course is Dr. R. R. Sobey, 6 Spence Street, Warrnambool.

Symposium on Breast Cancer.

The Melbourne Medical Post-Graduate Committee, in collaboration with the Anti-Cancer Council of Victoria, has arranged a symposium on breast cancer, to be held on Saturday, July 25, at the Royal Melbourne Hospital, from 11 a.m. till 2.30 p.m. All medical practitioners are invited to attend the presentation, without fee. The chairman of the symposium will be Mr. Julian Smith, and the programme is as follows: 11 a.m., anatomy, Professor S. Sunderland; 11.15 a.m., physiology, Professor L. Townsend; 11.30 a.m., pathology, Professor E. S. J. King; 11.45 a.m., surgery, "Diagnosis of Lumps in the Breast", Professor M. Ewing, "Surgery of Carcinoma", Mr. T. Ackland; 12.15 p.m., radiotherapy, Dr. W. Holman; 1.30 p.m., hormones—"Therapy", Dr. Pincus Taft, "Surgery of the Endocrine Glands", Mr. Charles Osborn; 2 p.m., "Palliative Treatment and Terminal Care", Mr. Victor Stone; 2.15 p.m., "Results of Treatment: Cancer Registry", Dr. E. V. Keogh.

After the presentation of papers there will be an opportunity for discussion. Luncheon will be provided at the hospital without charge. The Post-Graduate Committee requires notification of attendance by June 25.

Anæsthetics.

The course in anæsthetics, previously announced, will commence on July 6. Inquiries should be addressed to the Honorary Secretary, Faculty of Anæsthetists, Royal Australasian College of Surgeons, Spring Street, Melbourne.

Dermatology.

Attention is drawn to the demonstrations in dermatology, which the Victorian Branch of the British Dermatological Association and the Australian College of General Practitioners, Victoria Faculty, will conduct on July 11, at St. Vincent's Hospital.

Overseas Lecturer.

Professor Leo T. Samuels, Professor of Biological Chemistry, University of Utah, known for his work on steroid hormones, will lecture at 8 p.m. on Tuesday, July 28, in the Berry Lecture Theatre, Anatomy Department, University of Melbourne. His subject will be "Extra-Adrenal Factors Affecting Cortisol Metabolism in Man". The chairman will be Dr. Ewen Downie. In addition, Professor Samuels will conduct a seminar in the Biochemistry School at 4.15 p.m. on July 29, concerned with "Steroid Biosynthesis in the Interstitial Cells of the Testis and its Alteration in Malignancy".

PROFESSOR ROBERT KARK.

Professor Robert Kark, of Chicago, will give evening lectures in Melbourne on August 3 and 6 on "Management of the Patient with Acute (Virus A) Hepatitis" and "The Nephrotic Syndrome in Adults: A Common Disorder with Many Causes".

ADDRESS.

The address of the Melbourne Medical Post-Graduate Committee is 394 Albert Street, East Melbourne. Telephone: FB 2547.

Naval, Military and Air Force.

APPOINTMENTS.

The following appointments, changes etc., are published in the *Commonwealth of Australia Gazette*, No. 23, of April 9, 1959.

AUSTRALIAN MILITARY FORCES.

Australian Regular Army.

Royal Australian Army Medical Corps (Medical).

4/8045 Captain P. B. Opie is transferred to the Reserve of Officers (Royal Australian Army Medical Corps (Medical)) (Eastern Command), 14th February, 1959.

The Short Service Commission granted to 2/40110 Major (Temporary Lieutenant-Colonel) D. C. Cook is converted to a Long Service Commission.

Citizen Military Forces.

Northern Command.

Royal Australian Army Medical Corps (Medical).—1/61869 Captain (provisionally) I. L. Chapple relinquishes the provisional rank of Captain, 14th January, 1959, and is transferred to the Reserve of Officers (Royal Australian Army Medical Corps (Medical)) (Northern Command), in the honorary rank of Captain, 15th January, 1959.

Royal Australian Army Medical Corps (Medical).—1/33098 Captain E. F. Reye ceases to be seconded whilst in the United Kingdom, 21st January, 1959. 1/33098 Captain E. F. Reye is transferred to the Reserve of Officers (Royal Australian Army Medical Corps (Medical)) (Northern Command), 22nd January, 1959. *To be Captain (provisionally), 17th February, 1959*—1/61868 Robert Webb Hay.

Central Command.

Royal Australian Army Medical Corps (Medical).—To be Captain (provisionally), 26th February, 1959—4/38071 Henry Thomas Wilfred Harris.

Royal Australian Army Medical Corps (Medical).—4/31965 Major R. R. A. Brock is transferred to the Reserve of Officers (Royal Australian Army Medical Corps (Medical)) (Central Command), 5th February, 1959. *To be Temporary Lieutenant-Colonel, 18th February, 1959*—4/32064 Major R. S. Colton.

Western Command.

Royal Australian Army Medical Corps (Medical).—To be Major, 5th February, 1959—5/26525 Captain C. J. Benson.

Reserve Citizen Military Forces.

Royal Australian Army Medical Corps (Medical).

Eastern Command.—To be Honorary Captain, 4th January, 1959—Peter Francis Grainger.

Southern Command.—Honorary Captain D. R. Macdonald relinquishes the honorary rank of Captain on appointment to the Citizen Military Forces Melbourne University Regiment, 13th February, 1959. *To be Honorary Captain, 10th January, 1959*—Donald Ross Macdonald.

Eastern Command.—To be Honorary Captain, 29th January, 1959—Michael John Flynn.

Southern Command.—To be Honorary Captains—Bruce David Amos, 15th December, 1958, and John Cleaver Woods, 12th January, 1959.

The following officer is placed upon the Retired List (Central Command) with permission to retain his rank and wear the prescribed uniform, 28th February, 1959: Captain A. C. Savage.

Central Command.—Honorary Captain T. L. McLarty is retired, 28th February, 1959.

ROYAL AUSTRALIAN AIR FORCE.

Permanent Air Force.

Medical Branch.

Wing Commander D. A. S. Morgan, O.B.E. (04398) is appointed to be Honorary Physician to His Excellency the Governor-General, 14th November, 1958.

The following are appointed to a short service commission, on probation for a period of twelve months, with the rank of Flight Lieutenant:—Ronald William Plowright (0310776), 27th November, 1958 (with seniority as from 27th November, 1956); Cedric Frank Campbell, D.F.C. (018297), 19th January, 1959.

The following Pilot Officers (Students) are promoted to the rank of Flight Lieutenant:—C. E. Allardyce (0218325), T. T. Pietzsch (0218354), H. A. Stoksik (0218929), 12th December, 1958; J. T. Cummins (0312881), B. Walters (037263), P. B. Sims (0313287), A. V. L. Hill (036613), 20th December, 1958.

Squadron Leader D. M. Newman (013992) is appointed to a permanent commission, 5th December, 1958.

The resignation of Flight Lieutenant F. I. Walke (012787) is accepted, 9th January, 1959.

Flight Lieutenant J. E. S. Alwyn (04778) is granted special leave without pay, 25th January, 1959, to 24th January, 1960, inclusive.

Active Citizen Air Force.

Medical Branch.

No. 21 (City of Melbourne) Squadron.—Squadron Leader A. H. Toyne (0312774) is transferred to the Reserve, 29th June, 1958.

Retired List.

Medical Branch.

The appointment of Honorary Air Commodore R. B. Davis, O.B.E., as Honorary Physician to the Governor-General is terminated, 13th November, 1958.—(Ex. Min No. 6—Approved 16th March, 1958.)

Australian Medical Board Proceedings.

NEW SOUTH WALES.

THE following additions and amendments have been made to the Register of Medical Practitioners for New South Wales, in accordance with the provisions of the *Medical Practitioners Act*, 1938-1958:

Registered medical practitioners who have complied with the requirements of Section 17 (3) and are registered under Section 17 (1) (a) of the Act: Baker, Thomas George William, M.B., B.S., 1954 (Univ. Melbourne); Barbaro, Carmino Antonio, M.B., B.S., 1955 (Univ. Melbourne); Barnes, Keith Reginald, M.B., B.S., 1952 (Univ. Queensland); England, Henry Richard, M.B., Ch.B., 1947 (Univ. New Zealand), F.R.C.S. (England), 1954; Fisher, Stephen, M.B., B.S., 1946 (Univ. Melbourne), M.D., 1952 (Univ. Melbourne), M.C.P.A., 1956; Game, Charles Guildford Wardlow, M.B., B.S., 1952 (Univ. Melbourne); Gourin, Anatole, M.B., B.S., 1957 (Univ. Queensland); McCarthy, Neville John, M.B., B.S., 1953 (Univ. Melbourne); Thomson, Howard Donald Peter, M.B., B.S., 1957 (Univ. Melbourne); Wunderly, Harry Wyatt (Sir), M.B., Ch.B., 1915 (Univ. Melbourne), M.R.C.P. (London), 1925, M.D., 1927 (Univ. Melbourne), F.R.A.C.P., 1938, F.R.C.P. (London), 1952.

Registered medical practitioners who have complied with the requirements of Section 17 (3) and are registered under Section 17 (1) (b) of the Act: Carr, Janet Cameron, M.B., B.Ch., 1950 (Q.U. Belfast); Clarke, Brian, L.M.S.S.A. (London), 1954, B.M., B.Ch., 1954 (Univ. Oxford); Guthrie, Gordon Alfred, M.B., Ch.B., 1938 (Univ. Glasgow); Richardson, Joyce Margaret, M.R.C.S. (England), L.R.C.P. (London), 1949; Sale, Thomas Arthur, M.B., Ch.B., 1940 (Univ. Liverpool), F.R.C.S. (Edinburgh), 1949; Whaites, James Malcolm, M.B., Ch.B., 1944 (Univ. Edinburgh), D.O.M.S. (R.C.P. & S.), 1948.

Registered medical practitioner who has complied with the requirements of Section 17 (3) and is registered under Section 17 (2A) of the Act: Farkas, George Steven, M.D., 1951 (Univ. Budapest).

Registered medical practitioners who are required to comply with the requirements of Section 17 (3) and are registered under Section 17 (1) (a) of the Act: Marinkovich, Nevin John, M.B., B.S., 1958 (Univ. Adelaide); Tang, Teng Kooi, M.B., B.S., 1958 (Univ. Adelaide).

Royal Australasian College of Surgeons.

VICTORIAN STATE COMMITTEE: COURSE IN POST-GRADUATE SURGERY.

THE Victorian State Committee of the Royal Australasian College of Surgeons is arranging a course of instruction in post-graduate surgery to be held in Melbourne from August 3 to October 9, 1959. The course will be full time. During the mornings entrants will, with some restrictions, be able to attend and observe the work in the various clinical schools. Tuition will begin each week day at 2 p.m., and at 4 p.m. on each day there will be a session on clinical surgery. The course has been so arranged to enable anyone who wishes to do so to take off ten weeks prior to the final examination for the F.R.A.C.S. in October, to prepare for this examination. In addition, the clinical instruction is being conducted in the late afternoons, in order that senior resident medical officers may be able to attend this part of the course.

The fees for the course are (*a*) full time, 20 guineas and (*b*) clinical only, 10 guineas. Entries for the course close on June 30, 1959. Candidates when entering must forward a remittance for the fee, 20 guineas or 10 guineas as the case may be, *plus* exchange, in the case of candidates resident in Australia, for cheques drawn on banks outside Melbourne. Candidates resident in New Zealand or elsewhere, should remit by bank draft drawn on Melbourne in favour of the Royal Australasian College of Surgeons, and payable in Australian currency. Entries should be sent to the Honorary Secretary, Victorian State Committee, Royal Australasian College of Surgeons, Spring Street, Melbourne, C.1.

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED MAY 9, 1959.[1]

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.[2]	Australian Capital Territory.	Australia.[2]
Acute Rheumatism	1(1)	3(2)	2	1	..	..	..	..	7
Amœbiasis	..	..	..	..	..	..	..	..	..
Ancylostomiasis	2	..	1	..	..	..	..	..	3
Anthrax	..	..	..	..	..	..	..	..	..
Bilharziasis	..	..	..	..	..	..	..	..	..
Brucellosis	..	..	..	..	..	..	..	..	..
Cholera	..	..	..	..	..	..	..	..	..
Chorea (St. Vitus)	..	..	..	..	..	..	..	..	..
Dengue	..	..	..	..	..	..	..	..	..
Diarrhœa (Infantile)	4(1)	4(4)	2	..	..	..	..	..	10
Diphtheria	..	3(2)	..	..	..	..	..	..	3
Dysentery (Bacillary)	..	1(1)	2	1(1)	70(70)	..	..	..	74
Encephalitis	..	..	..	..	..	..	..	..	..
Filariasis	..	..	..	..	..	..	..	..	..
Homologous Serum Jaundice	..	..	..	..	..	..	..	..	..
Hydatid	..	..	..	..	..	3(3)	..	..	3
Infective Hepatitis	57(19)	34(8)	12(2)	6(1)	..	..	..	1	110
Lead Poisoning	..	..	..	1(1)	..	..	..	..	1
Leprosy	..	..	1	..	..	..	..	..	1
Leptospirosis	1	..	8(6)	..	..	..	..	..	9
Malaria	..	..	2(2)	..	..	..	..	..	2
Meningococcal Infection	1(1)	..	..	..	..	..	..	..	1
Ophthalmia	..	..	..	..	..	..	..	..	..
Ornithosis	..	..	..	..	..	..	..	..	..
Paratyphoid	..	..	..	..	..	..	..	..	..
Plague	..	..	..	..	..	..	..	..	..
Poliomyelitis	..	..	..	..	..	..	..	..	..
Puerperal Fever	..	..	..	..	..	..	..	..	..
Rubella	..	9(7)	..	..	..	1(1)	..	..	10
Salmonella Infection	..	..	..	..	1	..	..	..	1
Scarlet Fever	19(7)	27(21)	5(2)	9(3)	1	1(1)	..	..	62
Smallpox	..	..	..	..	..	..	..	..	..
Tetanus	..	2(1)	1	..	..	..	..	..	3
Trachoma	..	..	..	..	3(1)	3(1)	..	..	6
Trichinosis	..	..	..	..	..	..	..	..	..
Tuberculosis	34(22)	10(4)	15(10)	13(8)	..	3(3)	..	1	76
Typhoid Fever	..	1(1)	..	..	..	..	..	..	1
Typhus (Flea-, Mite- and Tick-borne)	..	..	..	..	..	..	..	..	..
Typhus (Louse-borne)	..	..	..	..	..	..	..	..	..
Yellow Fever	..	..	..	..	..	..	..	..	..

[1] Figures in parentheses are those for the metropolitan area.
[2] Figures incomplete owing to absence of return from Northern Territory.

Notes and News.

Bibliography on Fungous Infections.

The United States National Library of Medicine has just issued "Fungus Infections", a bibliography on systemic and superficial fungous infections. This is another in its series of selective bibliographies on subjects of current interest. Others in the series are on space medicine, cancer chemotherapy and staphylococcal infections. A complete list of such bibliographies is available. Single copies of the bibliographies can be obtained at no cost upon request to the Acquisition Division, National Library of Medicine, 7th Street and Independence Avenue, S.W., Washington 25, D.C., U.S.A.

Corrigendum.

THE USE OF RADIOACTIVE IODINE (I^{131}) IN THE DIAGNOSIS OF THYROID DISORDERS.

In the paper entitled "The Use of Radioactive Iodine (I^{131}) in the Diagnosis of Thyroid Disorders" by Bryan Hudson and F. I. R. Martin, which appeared in the issue of May 30, 1959, at page 731, two unfortunate errors relating to Figure I have occurred. In the first place the diagram has been printed upside down; also the key to the numbers on it has been omitted from the legend. The figure and legend should appear as follows:

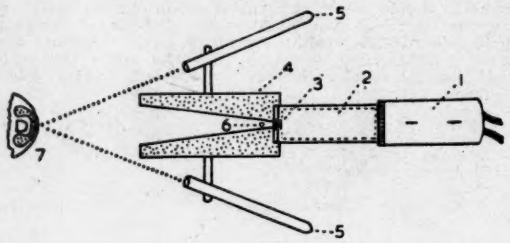

FIGURE I.

Diagrammatic representation of counting apparatus: 1, head amplifier; 2, photomultiplier tube; 3, sodium iodide crystal; 4, lead shield; 5, positioning lamps (distance); 6, centring lamp; 7, patient.

We regret these errors.

Notice.

BRITISH MEDICAL ASSOCIATION: NEW SOUTH WALES BRANCH.

Annual Ball.

THE fourth annual ball of the New South Wales Branch of the British Medical Association will be held on July 22, 1959, at 9 p.m., at the Trocadero, George Street, Sydney, in the distinguished presence of His Excellency the Governor of New South Wales, Lieutenant-General Sir Eric Woodward, K.C.M.G., C.B., C.B.E., D.S.O., and Lady Woodward. It is hoped that there will be a large attendance of members.

Deaths.

THE following death has been announced:

LAVERTY.—Colin Robert Moore Laverty, on June 5, 1959, at Sydney.

Nominations and Elections.

THE undermentioned has applied for election as a member of the New South Wales Branch of the British Medical Association:

Abbott, John Laurence, M.B., B.S., 1958 (Univ. Sydney), 30 Redgrave Road, Normanhurst.

Diary for the Month.

JUNE 15.—Victorian Branch, B.M.A.: Finance Sub-Committee Meeting.
JUNE 16.—New South Wales Branch, B.M.A.: Medical Politics Committee.
JUNE 18.—New South Wales Branch, B.M.A.: Clinical Meeting.
JUNE 18.—Victorian Branch, B.M.A.: Executive of Branch Council.
JUNE 20.—Victorian Branch, B.M.A.: Country Branch Meeting—Warragul.
JUNE 23.—New South Wales Branch, B.M.A.: Hospitals Committee.
JUNE 24.—Victorian Branch, B.M.A.: Branch Council Meeting.
JUNE 24.—South Australian Branch, B.M.A.: Annual Meeting.
JUNE 25.—New South Wales Branch, B.M.A.: Branch Meeting.
JUNE 26.—Queensland Branch, B.M.A.: Council Meeting.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales. Anti-Tuberculosis Association of New South Wales.

South Australian Branch (Honorary Secretary, 80 Brougham Place, North Adelaide): All contract practice appointments in South Australia.

Editorial Notices.

ALL articles submitted for publication in this Journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations, other than those normally used by the Journal, and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given: surname of author, initials of author, year, full title of article, name of journal, volume, number of first page of the article. The abbreviations used for the titles of journals are those of the list known as "World Medical Periodicals" (published by the World Medical Association). If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors submitting illustrations are asked, if possible, to provide the originals (not photographic copies) of line drawings, graphs and diagrams, and prints from the original negatives of photomicrographs. Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary is stated.

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